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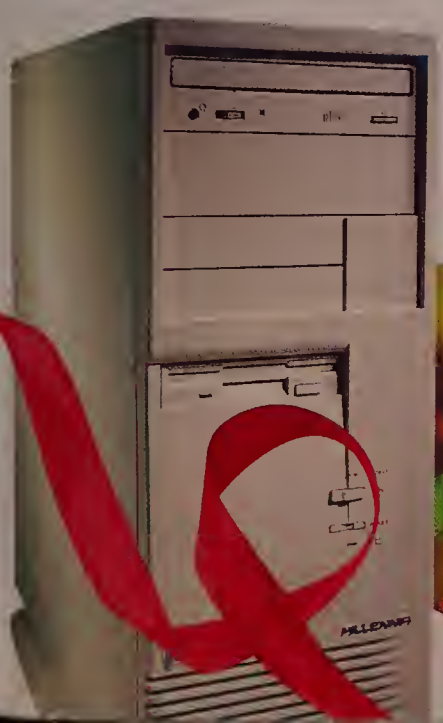

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Circle 205 on reader service card

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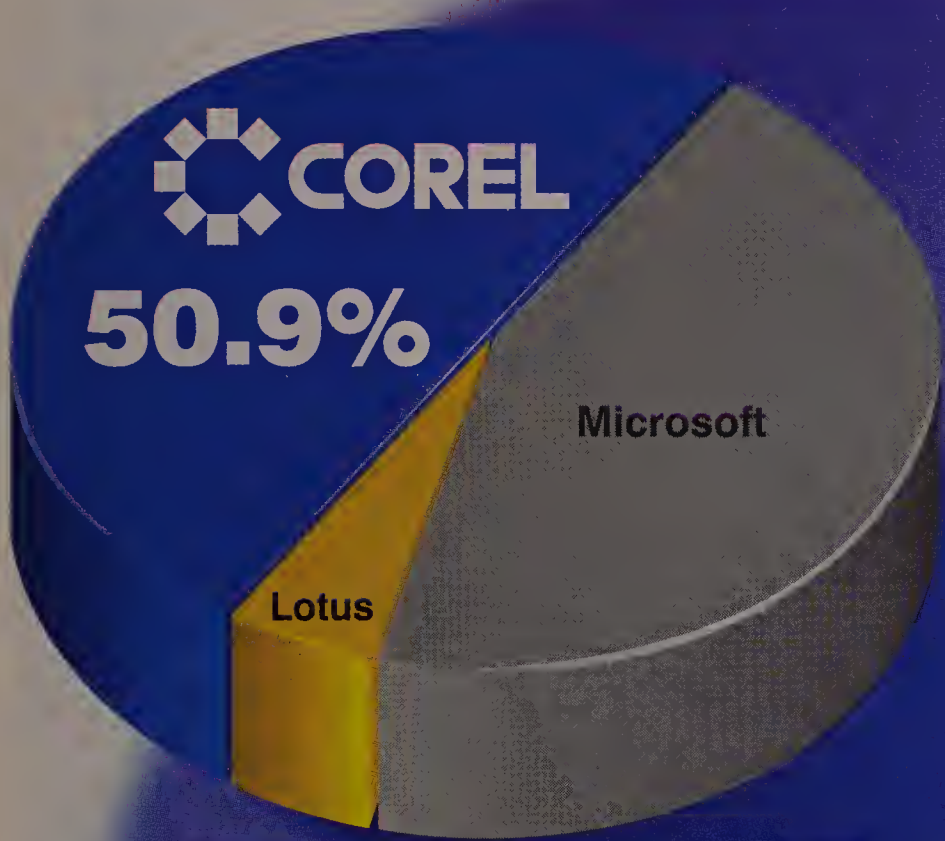

†Data received from PC Data, the most credible and comprehensive auditor of software sales in the U.S. Based on unit sales for MS-DOS, Windows® and Windows® 95 products at retail, June 1996.

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Office Suite Market Share

Company	%
COREL	50.9
Microsoft	44.7
Lotus	4.3

Circle 70 on reader service card

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PC WORLD

DECEMBER

VOLUME 14 ◆ NUMBER 12 ◆ MULTIMEDIA EDITION

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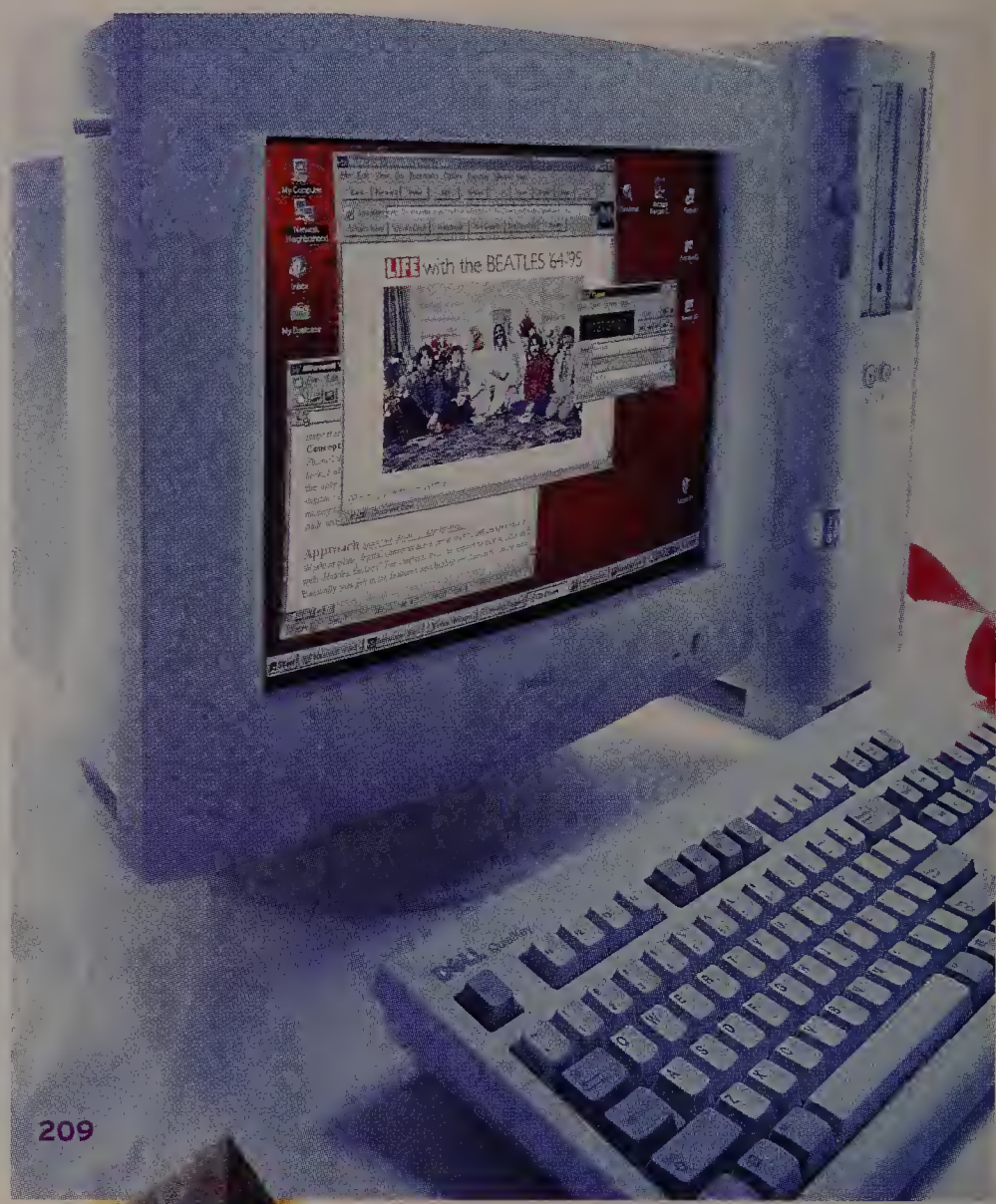

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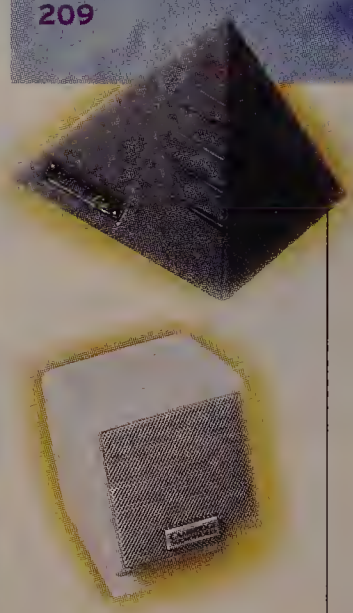

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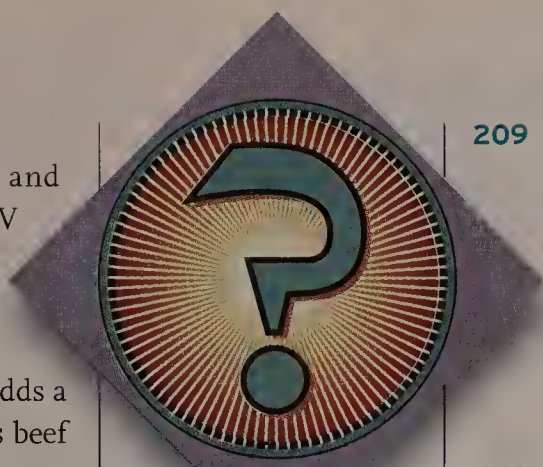

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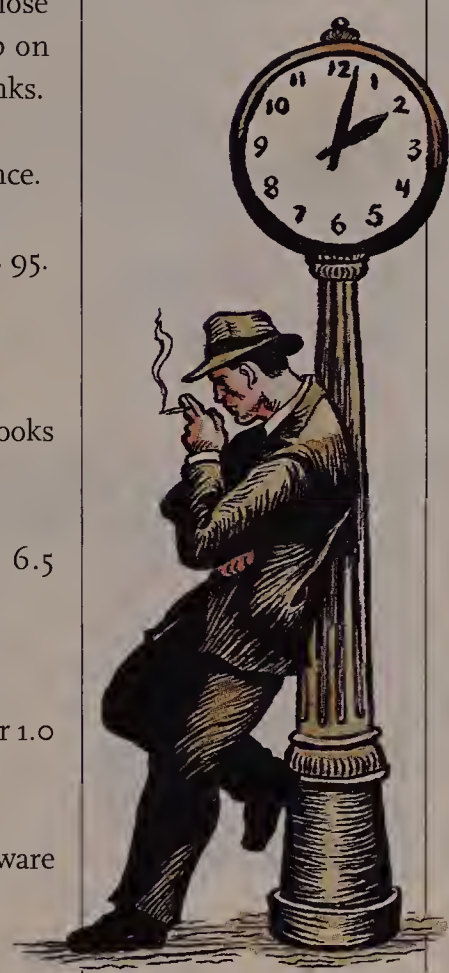

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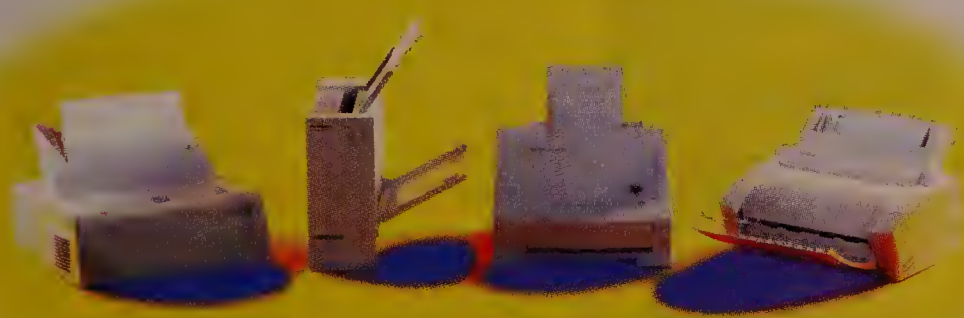

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3-D PC: A NEW PERSPECTIVE

REVIEW We ran 3-D software on the latest 3-D graphics cards. Of the ten cards we reviewed, only a few stand out.
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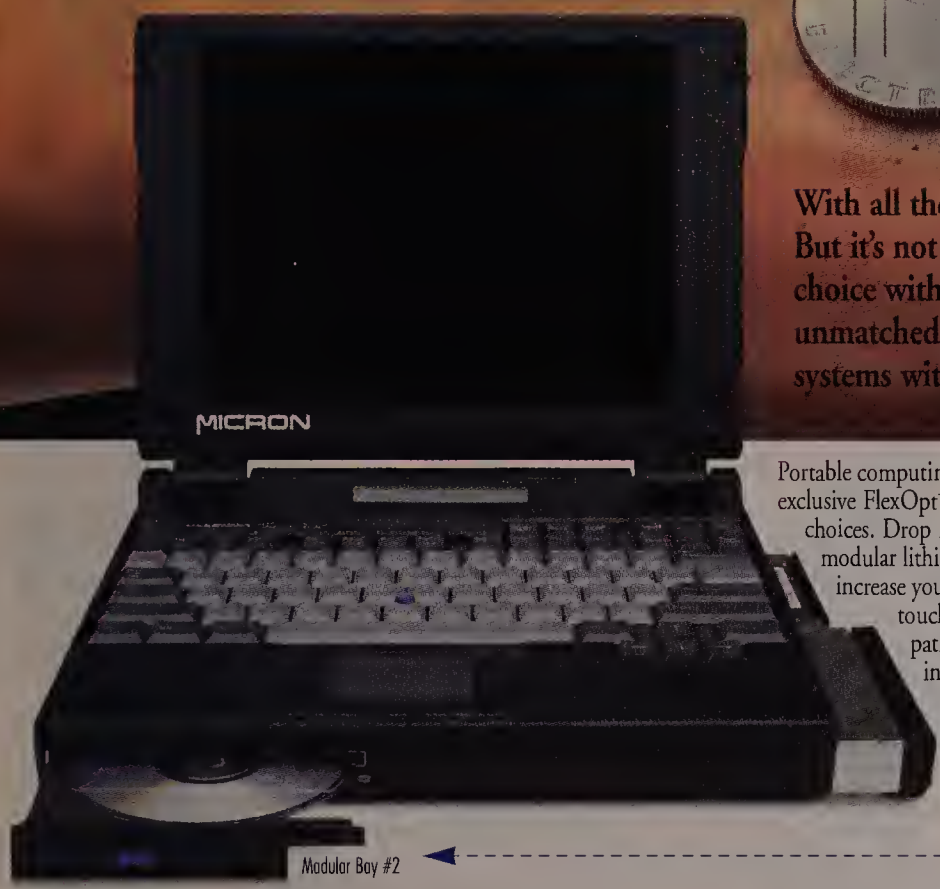

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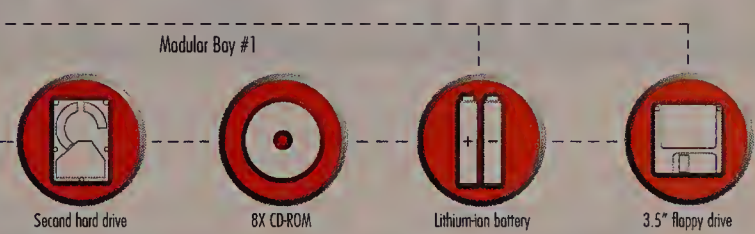

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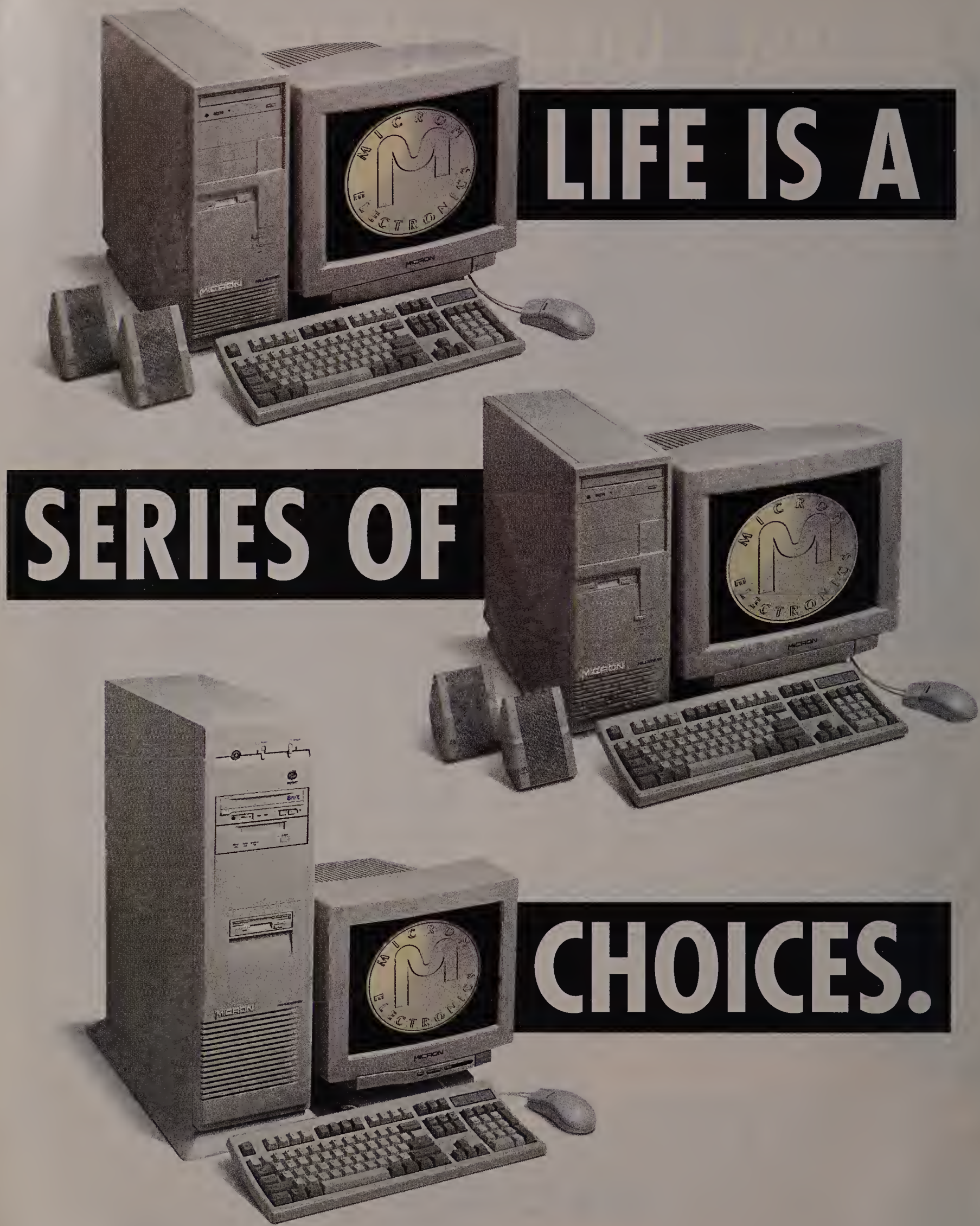

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Lies, Damned Lies, and Search Engines

IMAGINE LISTENING TO THE PLAY-BY-PLAY of a football game. "Here's the first big third-down play of the Frito-Lay Siesta Bowl. The quarterback for the Coca-Cola Cowboys drops back to pass. He throws the United Airlines ball down the field past the Rand McNally midfield stripe. The receiver hauls in the ball and, yes, it's a first down on the Coca-Cola Cowboys 43-yard line. No, wait. The TurfBuilder referee is signaling that the pass hit the ground and was incomplete. That will bring up a fourth down for the Pacific Bell 49ers, and they'll be forced to punt. There's the snap. Oh, no! It's a fumble! The Du Pont Teflon line judge is signaling that the Cowboys have recovered on the PacBell 49ers 38-yard line." What the hell, it's only sports. Nothing is lost but enjoyment of the game. And at least these commercial intrusions are aboveboard.

More insidious are television and movie "product placements." Both characterization and integrity suffer when commercial considerations lift James Bond out of a high-powered, quintessentially British Aston Martin and plunk him down in an underpowered BMW. Now product placement is invading cyberspace, where an online soap opera—Madeleine's Mind—has agreed to write an Intel Internet Phone into its plot. But hey, this is only fiction. Who's to say that a fictional character can't sell out?

Allegations against **search engines** point to a potentially **huge problem** that could **undermine** cyberspace.

YOU GET WHAT THEY PAY FOR

WHAT JAMES BOND DRIVES is one thing, but what a search engine finds in response to your query is quite another. You've come to expect software to do your bidding objectively, based on parameters you enter. Now some reliable off-the-record sources are alleging that some search engine companies are changing all this. The sources say these unnamed firms are selling *relevancy:* A business pays the search engine company, and the search engine is rigged to find the business's Internet address more often and put it nearer the top of the list of recommended sites. This deceptive practice would increase search engine revenues and bring new traffic to cooperating Web sites. It would also be extremely difficult to prove without inside sources. As you read Dylan Tweney's entertaining and informative "Searching Is My Business: A Gumshoe's Guide to the Web," add one more tip: Examine a search engine's recommendations as critically as you would those from any other source.

SERVICE OR DISSERVICE?

THE ALLEGATIONS AGAINST search engines point to a potentially huge problem that could undermine cyberspace's potential to extend and improve service journalism. While a print magazine can recommend products for a typical reader, online publications can invite you to enter your own criteria and make a recommendation just for you. For example, *PC World*'s Top 20 review recommends PCs in several categories based on results of reader surveys about the relative importance of such factors as price, performance, reliability, and service. PC World Online's Interactive Top 20 goes a step further and lets you change the weighting for these factors, then generates a personalized recommendation. While the Interactive Top 20 performs objectively, purportedly objective programs that ask for your specs and then help you select products or services could be subverted. A program for picking a Caribbean resort could recommend a beach hotel with ankle-high waves even after you've indicated surfing is your priority. A program for choosing a PC could recommend a certain brand even if it doesn't best match your criteria. How would you know?

SETTING ETHICAL STANDARDS

PRINT MAGAZINE JOURNALISTS have developed ethical standards that aim to protect readers from being misled. For example, the guidelines of the American Society of Magazine Editors require labeling of ads if they look like editorial content, preclude placing ads near editorial material in a manner that might suggest endorsement of products, and so on. These guidelines can be broken, of course, but ASME is likely to reprimand publications that transgress. Online information sources don't yet have comparable guidelines.

The ASME board is working on guidelines for online editorial content intended to assure that online readers always know who controls the information they're reading. Among other things, the new guidelines will try to assure that programs on magazine sites that perform searches or recommend products operate free of covert commercial influence. ASME's guidelines will of necessity apply only to magazine sites, but you should accept nothing less from any information provider in cyberspace.

Phil Lemmons is editorial director of PC World. ■

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PC WORLD BEST BUY — June 1996, WinBook XP5 P120 16/1.3GB Active Matrix

WINDOWS MAGAZINE RECOMMENDED — October 1996 Windows Recommended WinBook XP5/P120

April 1995 BYTE BEST VALUE 486DX4 NOTEBOOK — April 1995, WinBook XP Best Value 486DX4 Notebook

EDITORS' CHOICE AWARD — January 1996 PC Laptop Editor's Choice — WinBook XP, XP5

WWWWW — March 1996, Windows 5 of 5 Rating WinBook XP5

PC MAGAZINE EDITORS' CHOICE — August 1996 PC Magazine Editors' Choice WinBook XP5 P100

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September 1996
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April 1996
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MacUser magazine, in their December '95 issue, named the 17GA its Best Buy and in their March '96 issue, gave the 15GA a coveted Four Mice rating.

Windows magazine, in their December '95 and April '96 issues, "recommended" the 17GA.

February '96 issue of PC Graphics and Video "Highly Recommended" the 17GA.

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Recommended Resolution	1024 x 768 @ 85 Hz	1024 x 768 @ 85 Hz
*Integrated Spkrs./Mic.	Yes	Yes
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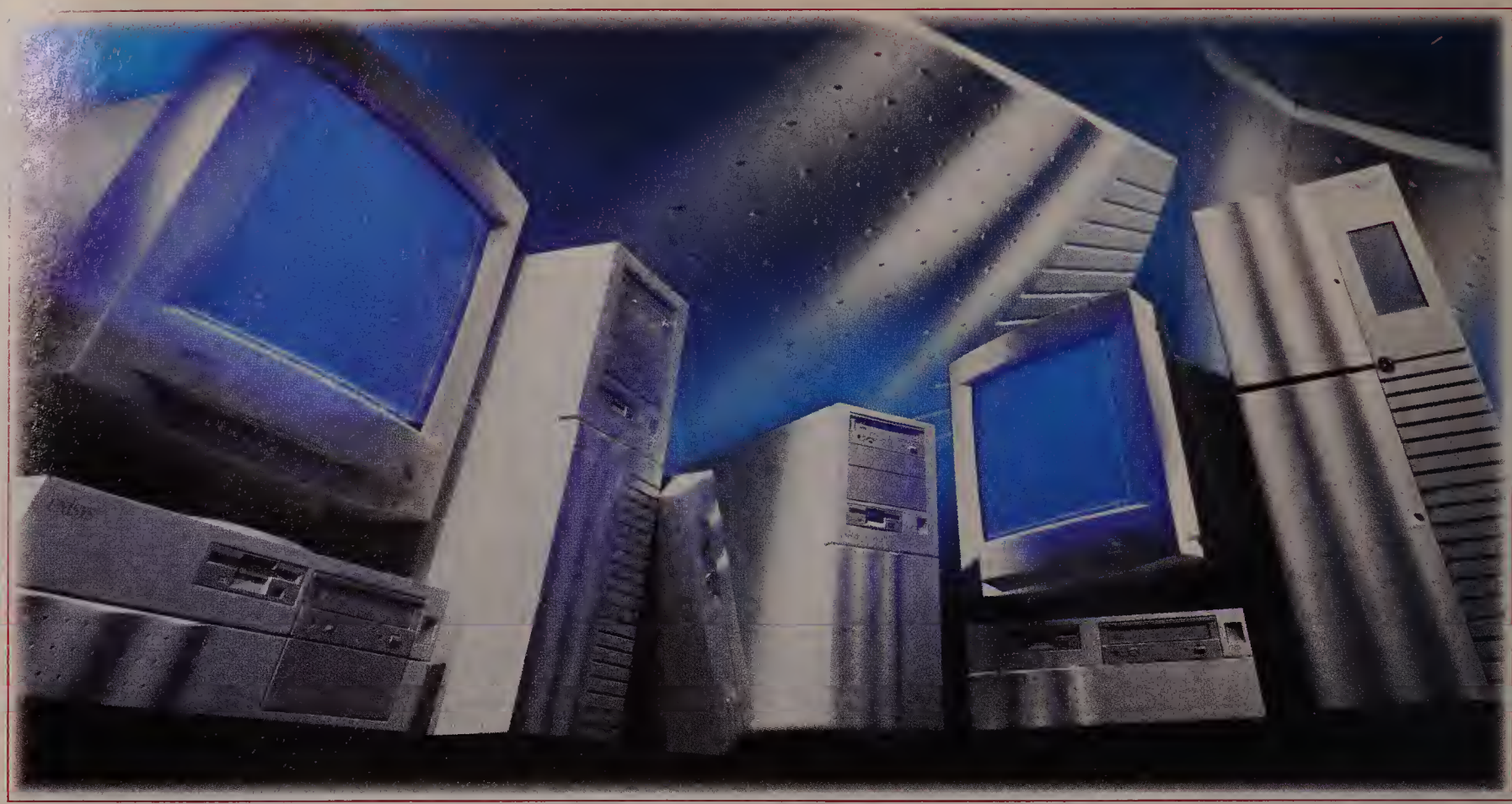

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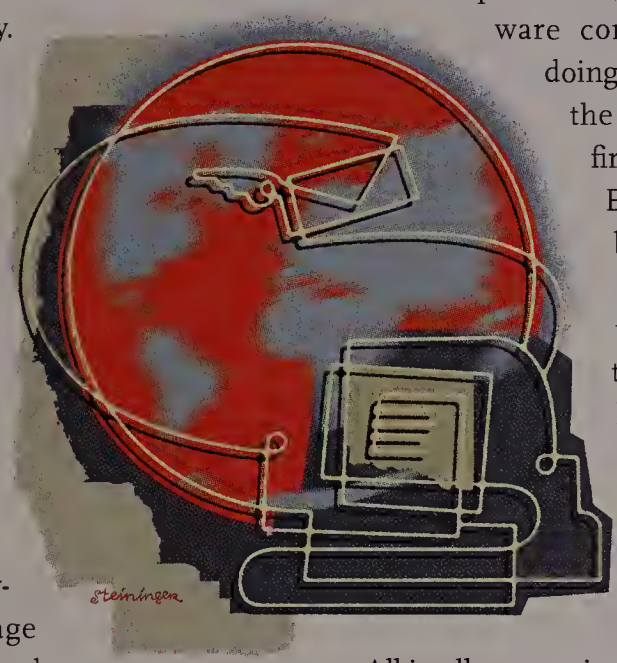
YOUR TAKE ON: Internet slowdowns ◆ Public beta testing ◆ Component swapping

OVERLOADED NET

NICE TO SEE YOUR detailed coverage of the Internet ["Internet Overload: Disaster in the Making?" October]. I believe your illustration "Untangling the Net: The Not-So-Simple Route of a Simple E-Mail Message" paints a picture more dismal than reality. It implies that an e-mail message is transmitted in its entirety from one router to the other and may linger on a router. This was once true, but is generally not the case now. From the originating mail server to the receiving one, a message travels straight through.



Also, the bottlenecks on the core of the Internet affect Web browsing far more than they affect e-mail. If there is a 3-second slowdown on the core of the Net, your Web browsing will take 3 seconds longer. A mail server is content to wait several minutes on a connection to the receiving server before giving up. The mail server will also retry the delivery until it gets through. So even in the worst network brownouts, e-mail will continue to work well, while the Web may be unusable. Thus, Web browsing would have been a much more suitable illustration of the issues the article addresses.

Laurence Lundblade, San Diego

Editor's response: Good point. Web pages would probably be more adversely affected by an Internet brownout. We chose e-mail as our example because we felt it would better illustrate the complex series of connections that make up the Net. **–Yael Li-Ron**

THE UPSIDE OF BETA SOFTWARE

IN REFERENCE TO Stephen Manes's *Full Disclosure* column ["Software Today: It's All Beta," October], I just wanted to point out that much of the software on the Internet is developed by small start-up companies or by individuals. These developers do not have the resources to hire groups to alpha- and beta-test their prerelease software. Distributing it over the Internet is a cheap way to have software tested on a variety of machines and setups. In fact, many larger software companies may be doing the same thing in the future. Microsoft first released Internet Explorer as public beta. As some small companies that beta-test over the Internet grow larger, a company may decide to release all its products that way. Netscape is a good example.

All in all, you can't really criticize small operations for using the Internet for their beta testing. So go download some beta software and send in those bug reports!

Ben Greenberg, Elkins Park, Pennsylvania

WHAT'S INSIDE YOUR PC?

THANK YOU FOR ALERTING readers to the practice of substituting off-brand components for name-brand parts ["How to Get What You Want in Your New PC," *Top of the News*, October]. However, it is the name-brand components that seem to find their way into the machines tested by magazines. The unit *PC World* tests is not always the same unit a customer receives from the vendor.

I found this out a few years ago, when glowing reports from the trade magazines convinced me to plunk down 10 percent of my annual income on a Gateway Pentium P60 system. Suffice it to say, the P60 that was delivered to me did not have the same components that were specified as being in the units the magazines reviewed. After laying that much coin on the table, I found this bait and switch a wee bit upsetting.

Bob Hively, Internet

Author's response: The article discusses the fact that PCs reviewed in *PC World* and other publications may be sold with different components, and it offers advice on how to get what you want. If nothing else, confirm system specifications in writing before you buy. **–Michael Desmond**

FINDING HELP FOR FREE

KIRK STEERS DID A FANTASTIC job of identifying the differences between help for a fee and help for free ["The Complete Guide to Free Help Online," October]. Illustrating the frustrations and different ways of getting help is very timely, considering the expansion of everyday access to the Internet. Great article! But I wish Steers had revealed what he found out about how to save the password in Dial-Up Networking for Windows 95.

Kyle Hall, Richmond

Author's response: The root of the problem is Windows 95's inability to find a password cache file. But one quick and easy workaround is to install the Windows 95 Microsoft Network client, even if you're not connected to a network. For more information and some alternative solutions, see "Dial-Up Networking Password Is Not Saved" in Microsoft's Knowledge Base (http://www.microsoft.com). **–Kirk Steers**

MORE ON OFFLINE READING

TO EACH HIS OR HER OWN online service, but I'd like to point out to CompuServe user John Kafalas (*Letters*, October) that since America Online 2.0 came out, AOL users have indeed been able to send and receive e-mail and newsgroup postings, unattended, via FlashSessions. You can then read the messages offline.

JoAnne Sarro, San Bruno, California

USED PARTS, TAKE 2

I READ WITH AMUSEMENT your column on computer companies using parts from used computers (*Consumer Watch*, October). As a retired electronics engineer specializing in the failure diagnosis and analysis of electronics components, I don't understand the concerns.

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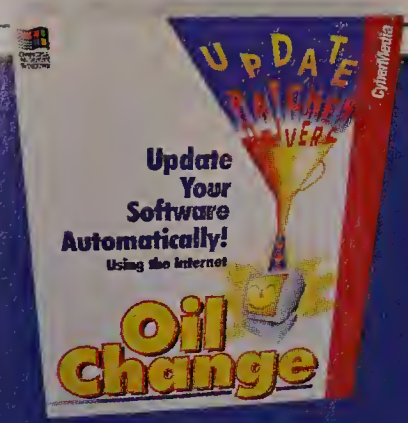

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If I had the choice of buying a computer with all brand-new parts or one made up of good, used, tested devices, I would choose the latter every time.

Alfred J. Chapkovich,
Allentown, Pennsylvania

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

CORRECTIONS AND CLARIFICATIONS

On page 150 in November's "Upgrades: The Best for the Buck," a technical problem caused prices to be deleted in a table. Here is the table in its entirety.

Which Upgrade Is for You?

If you have a...	The best upgrade is...	Why?	Cost
486SX or lower	a whole new system (Pentium or better)	Your motherboard is old, the hard disk is slow and low in capacity, and the graphics card is on its last legs. If you're planning to use Windows 95, there are no shortcuts for you.	$1500 and up
486 with 8MB of RAM (30-pin SIMMs)	to add 8MB of RAM	If you have 8MB, odds are both your memory banks are full, which means you'll have to discard your existing SIMMs and get 16MB worth of new ones. 30-pin SIMMs are hard to find and more expensive than their 72-pin counterparts.	$280 and up
486 with 8MB of RAM (72-pin SIMMs)	to add 8MB of RAM and a new processor	The combination of 16MB of RAM and a CPU upgrade delivers the most bang for your buck. Our upgraded 486-66 test systems performed on a par with the average Pentium-75 with 8MB.	$200 to $300
486 with 16MB of RAM	a CPU upgrade kit	You won't get any performance boost from upgrading to 32MB.	$129 to $200
Pentium with 8MB of RAM	to add 8MB of RAM	The extra RAM delivers three times the performance boost of an OverDrive processor upgrade.	under $100
Pentium with 16MB or more of RAM	none (save your money)	More RAM will provide minimal gains for Windows 95 users. An OverDrive chip would be too expensive to justify the minimal performance boost.	$0

November's Top 10 Printers should have stated that the HP Color LaserJet 5M's maximum paper capacity is 500 sheets, and that all other color printers on the chart have maximum capacities ranging from 500 to 1750 sheets.

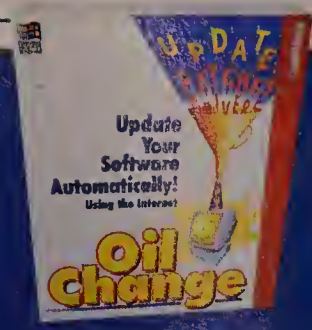
October's "The Complete Guide to Free Help Online" should have listed two CompuServe forums for Adobe Systems: go adobesys and go adobeapp. The company also is on AOL, keyword adobe. In addition, support from Maxtor Corp. is at technical_assistance@maxtor.com.

In October's *New Products*, the phone number for Snap-In Softools should be 888/476-2746. The URL for Ernst & Young LLP also appeared incorrectly. It is http://ernie.ey.com.

The correct URL for downloading Windows 95's Backup utility (*Bugs and Fixes*, October) is http://www.microsoft.com/windows/software/backupd.htm. And the URL for Microsoft's Internet Explorer 3.0 bug fix (November) is http://www.microsoft.com/msdownload/iepatch.htm.

Due to an error by the vendor, we published the wrong price in September's Top 10 Monitors for the IBM P70 17-inch monitor. The correct price is $1069.

PC World regrets the errors.



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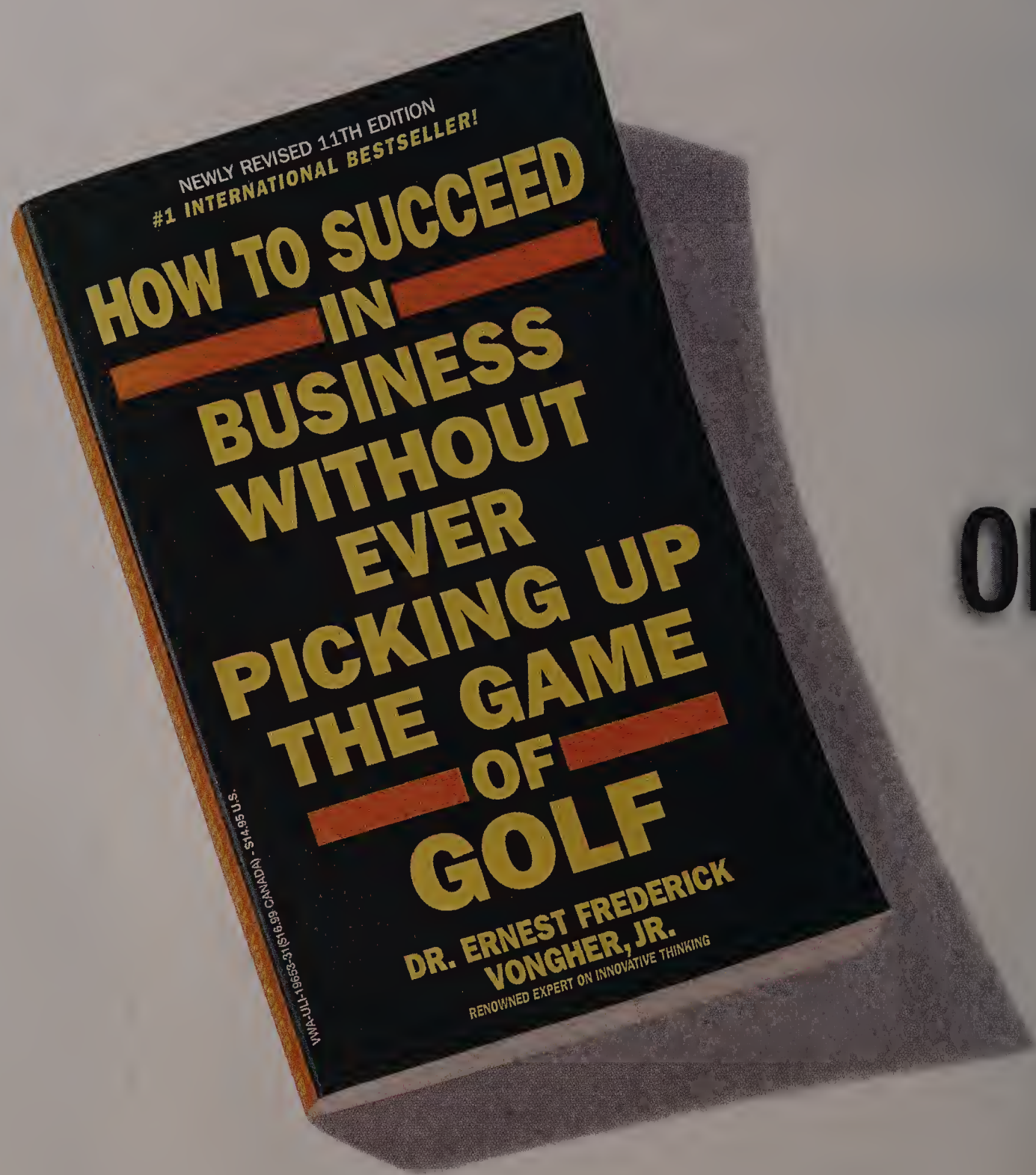

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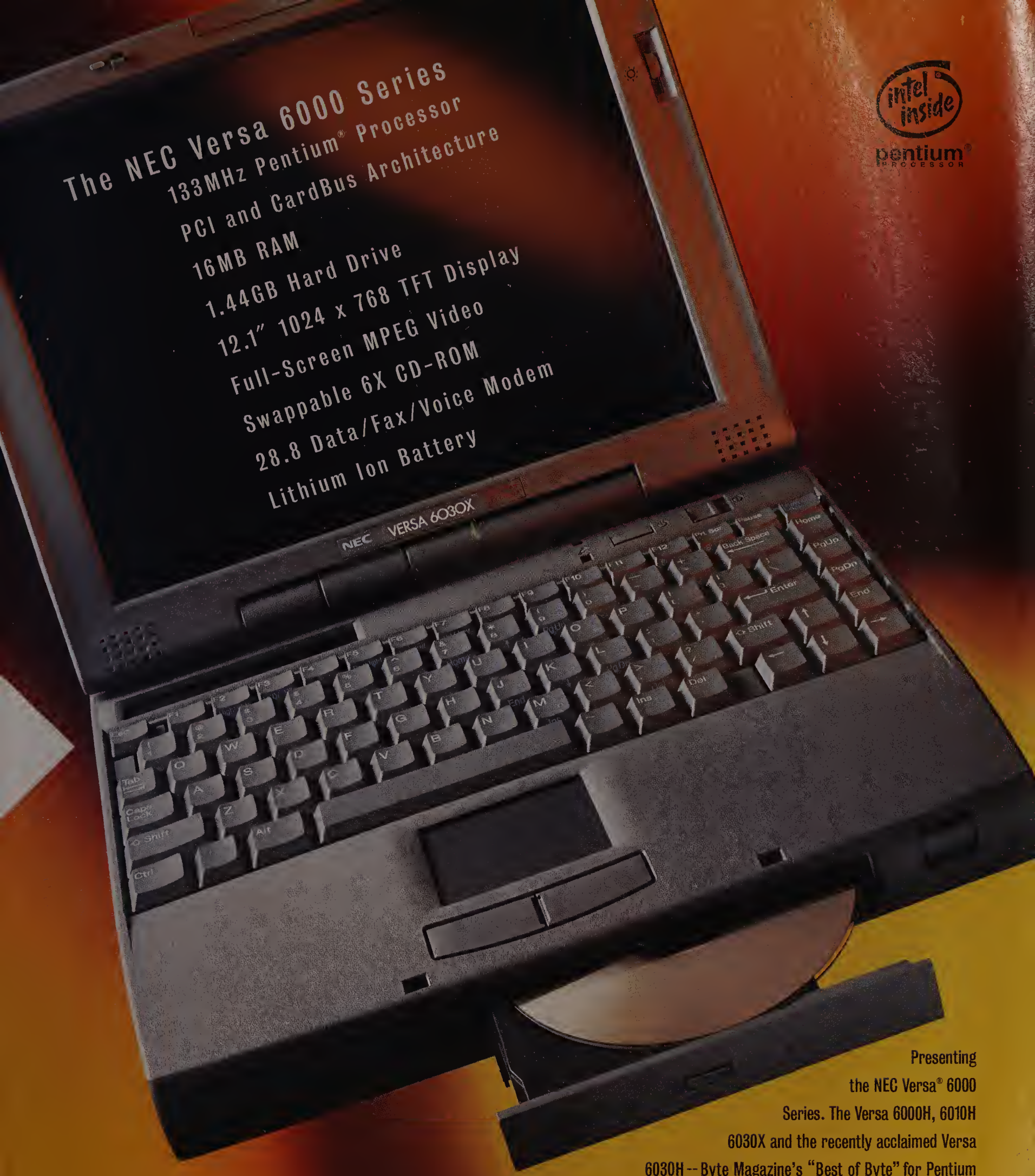

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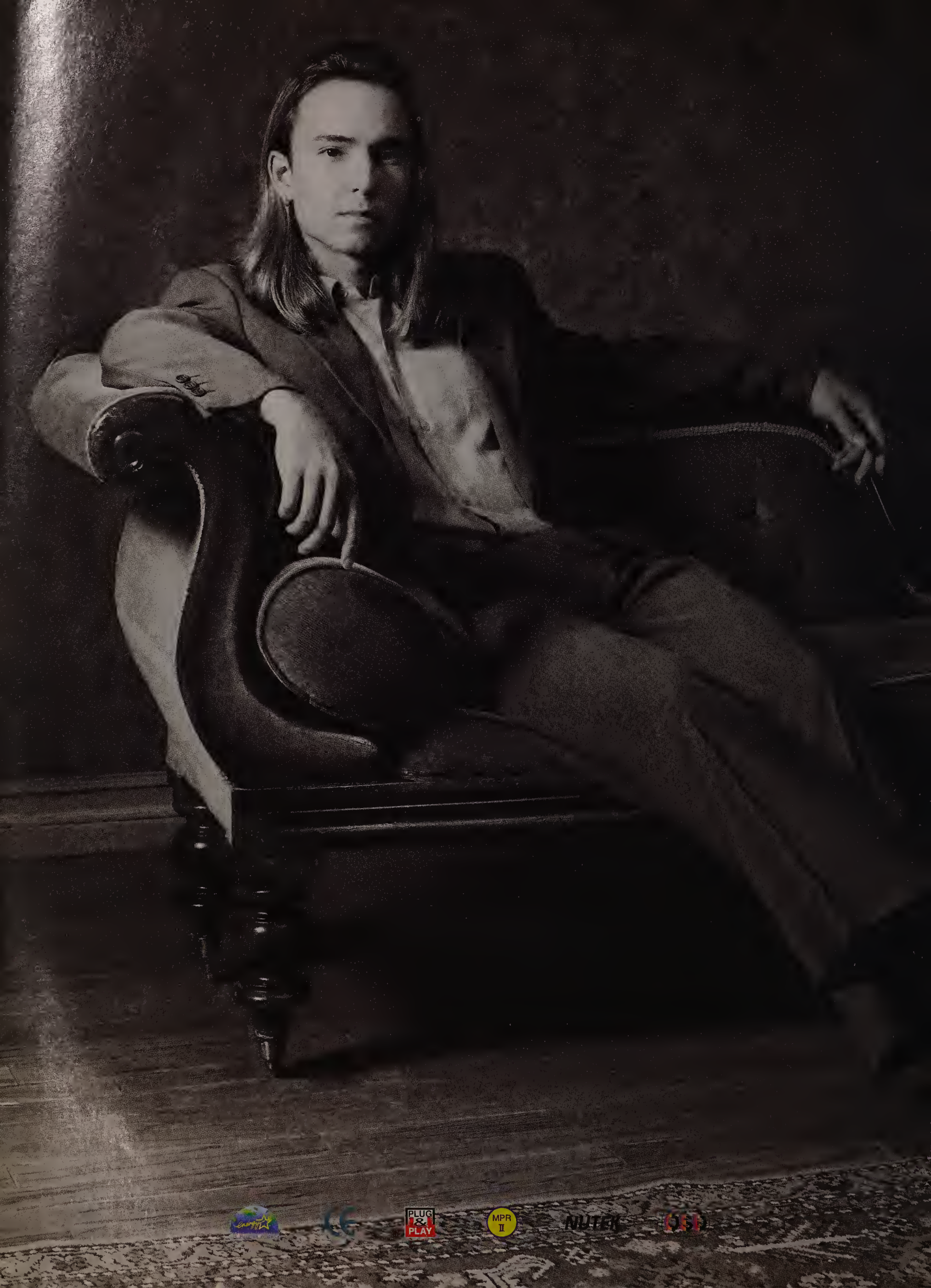
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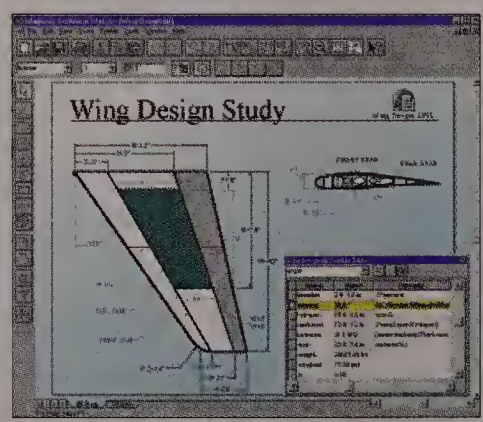

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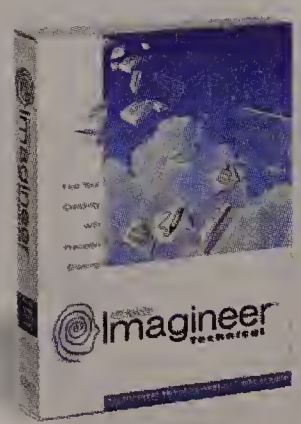

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Extended Warranties: Good Investment or Waste of Money?

As original warranty periods for PCs get shorter, extended contracts may be worth considering.

PHOTOGRAPH: CHIP SIMONS

YOU CAN'T BUY a computer from a retail store without salespeople bombarding you with the marvels of their extended service plans. The conversation usually starts with a critique of the PC maker's limited warranty and service options, then segues into the many wonderful benefits available "for a just a few dollars more."

We've all heard the pitch when buying home electronics equipment. If you are like me, you probably cut the poor salesperson short, convinced that extended service plans are a waste of money. But with PC warranties shrinking almost daily, added protection has started to look more and more attractive.

It wasn't that long ago when three-year warranties were the norm for PCs. Although many mail-order companies still provide multiyear warranties, a one-year warranty is pretty standard for systems sold through retail stores. Most companies give you the option of either having the PC repaired in your home or taking it to a local service center. (Compaq will come to your home only during the first 90 days.) Some companies offer an additional two years of coverage for replacement parts, but the labor costs are your responsibility. And the length and type of warranties vary for each product line.

Tech support—the other critical component of a PC warranty—can also cost you. For example, if you buy a Compaq Presario, you pay for support during the warranty period unless the call involves a hardware defect. For IBM, NEC, and Sony computers, you begin to pay tech support fees once the original warranty expires.

So if you're going to wind up paying for service in the end, maybe these extended contracts aren't such a bad deal after all. Besides getting a few more years of coverage, you'll have insurance against damages resulting from power surges, plus another source of answers to technical questions. To find out if an extended warranty is right for you, answer this question:

Are you the type of person who

(a) feels perfectly at home tinkering inside your computer, or

(b) would rather undergo root canal surgery than dismantle your PC and replace a hard drive or sound board?

If you selected (a), then extended warranties might be a waste of money for you. But if you chose (b), extended warranties are certainly worth considering.

Although all the major retail stores offer extended warranties, the details of these plans vary considerably. CompUSA, for example, offers three-, four-, and five-year plans for PC hardware, all of which run *concurrently* with the manufacturer's warranty. Extended warranties through Circuit City stores, on the other hand, don't start until the manufacturer's warranty expires and typically run for four years.

As with any kind of insurance policy (which is what an extended warranty really is), the more expensive your equipment, the more you ▶

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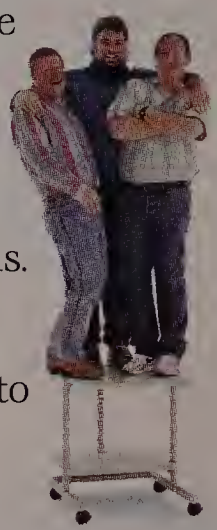

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pay for the added protection. A three-year warranty usually costs about 10 percent of your computer's purchase price. That's a lot of money, but with out-of-warranty labor charges running in the vicinity of $50 an hour, you can quickly rack up a $200 charge for a single repair.

In addition to the plans that retail stores offer, some personal computer manufacturers sell their own extended warranties. If the company has a good customer service record, you may be better off going that route. Whatever type of plan you're considering, ask for a copy of the warranty before you invest.

These plans are often full of conditions, and the promotion may tout benefits that are less special than they seem. CompUSA, for example, plugs the "no lemon" clause in its extended service plan as the ultimate protection against a trouble-prone product. In fact, the plan provides only for the replacement of any *component* that breaks down more than three times during the warranty period—something you'd probably get anyway, since many components are replaced rather than repaired. So you may get a new hard drive, a new sound card, even a new CD-ROM drive, but chances are you won't get a whole new PC.

WHAT'S RIGHT FOR YOU?

HERE ARE SOME guidelines for evaluating which service plan—if any—makes sense for you.

◆ *What level of protection does the PC company offer?* Make sure you understand the warranty coverage and service options that come standard with your PC. Otherwise, you might end up paying extra for services you're already getting for free.

◆ *How important is on-site service to you?* Do you really need someone to come to your home or office to fix your computer? If you've got a busy schedule, it may be simpler for you to bring your system in for repairs than to coordinate a time for the technician to make an on-site visit. Some plans let you choose between on-site service and a carry-in warranty. The carry-in plans cost less, and they can be especially attractive if you live or work close to a service center. ▶

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COMING UP

IN JANUARY

ELECTRONIC FINANCE: IT'S PERSONAL

Your PC can help you handle your personal finances, but is it worth the effort? We found strategies for managing your money electronically, including features and pitfalls in popular programs, how to find out where your money is going, and the best investment options on the Web.

NT 4.0: WIN 95 WITHOUT THE WORRY?

Microsoft's NT Workstation has long been touted as powerful and robust. And with a Win 95–style interface, NT 4.0 becomes easier to use as well. We'll compare NT 4.0 and Windows 95 to help you figure out which Windows works best for you.

EASY GRAPHICS FOR HOME AND WORK

From cool creative tools to business graphics software, here are 12 great graphics packages—all inexpensive and designed to help you turn out professional-looking artwork.

LOW-COST SCANNERS: SPICE UP WEB PAGES AND MORE

Taming piles of paperwork or sprucing up a Web page or presentation? Low-price scanners are simple and much improved. We test eight models priced under $500.

ALSO NEXT MONTH:

▶ **The PC World Top 100:** Updated monthly, this is the most current buyers guide to PCs and peripherals. Check out the Top 20 Power Desktops, Budget Desktops, and Notebooks, along with the Top 10 Workgroup Printers, 17-Inch Monitors, External and PC Card Modems, and Graphics Boards.

▶ **Special Report on the Web and Your Business:** The Top 10 Workgroup and Enterprise Servers to set up savvy Web sites, plus a look at software for intranets.

▶ **Here's How:** Real Problem, Real Solution—responding to customer requests from your Web site, and much more.

PC WORLD

CONSUMER WATCH

◆ *How often do you upgrade your equipment?* Don't buy a five-year plan if you usually buy a new system every two years. But if you tend to keep your computers until they can no longer run all the cool new software, a long-term contract makes more sense.

◆ *Does the package include free technical support?* Some service plans come with a toll-free technical support line—a valuable resource if your PC manufacturer charges for technical support or if the company's lines are constantly busy.

Don't expect the technical support services to cover software questions, though. That level of service is typically available only through a 900 line, where you'll be charged about $2 per minute.

Note: If you're considering a system manufacturer's own extended warranty, check to see if the plan comes with a separate toll-free support line, in addition to the toll-free number that all customers can access.

◆ *Who will service your PC?* Most retailers contract with an independent service provider, such as General Electric, to handle extended-warranty work. Find out who provides the service—and whether they have a repair center in your area.

◆ *Don't hurry to commit to a plan before you've done your research.* Most stores allow customers 30 days from the date of purchase to buy an extended warranty with no additional charge.

Like any kind of insurance, extended warranties are a bit of a gamble. You might plunk down $200 or more and wind up never needing the services. Then again, your motherboard could fail right after the manufacturer's warranty expires, leaving you with a hefty repair bill. The odds will be in your favor, though, if you research all your options and make an educated decision.

Send your comments about warranties, extended or otherwise, or any other topic you'd like to see covered in Consumer Watch *to consumerwatch@pcworld.com. Roberta Furger is a contributing editor for* PC World *and the author of the forthcoming* CyberGirls *(Warner Books, 1997, 212/522-7200).* ■

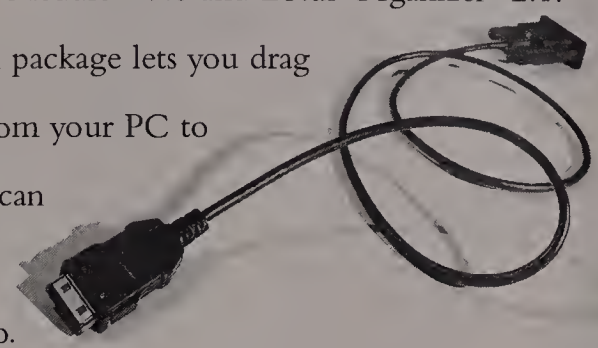
This is for everyone who's been burned by technology that didn't work as promised. It's a palmtop computer that actually does what it's supposed to do. No exceptions. No excuses. No kidding. Introducing the new Series 3c from Psion — the maker of the world's best-selling palmtop,* and with ten years of experience, it's no wonder.

Works just like a computer. Funny, it *is* a computer.

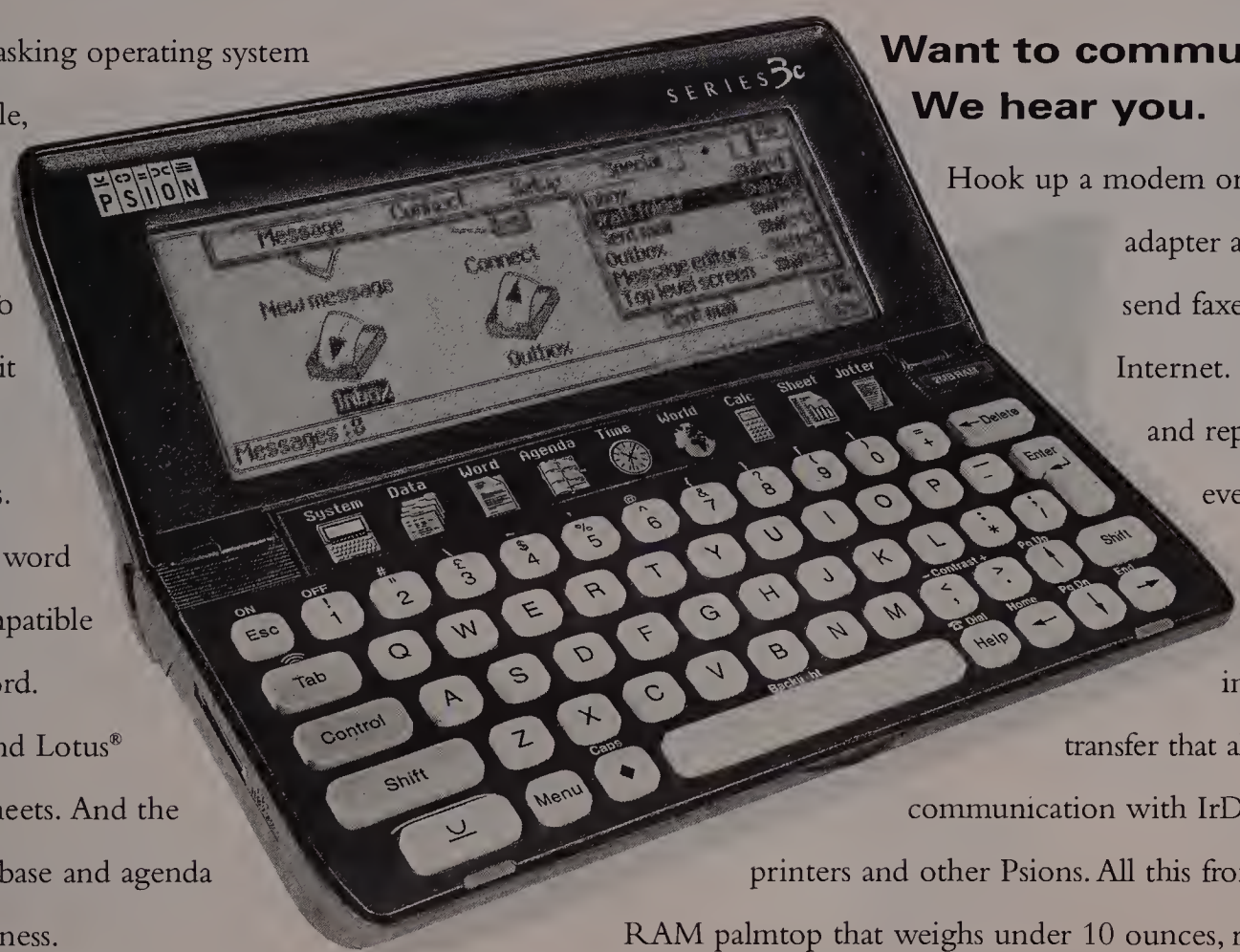
The Series 3c is a fully functional computer, complete with a preemptive, multi-tasking operating system that's fast, expandable, and windows-driven, just like the PC on your desk. To that we add a backlit screen and robust, built-in applications. Like a full-featured word processor that's compatible with Microsoft® Word. Complete Excel® and Lotus® compatible spreadsheets. And the most advanced database and agenda software in the business.

Will it get along with your PC? Glue should bond this well.

The Series 3c connects and integrates easily with your PC. With just one click, you can synchronize your calendar and contacts with popular personal information managers, including Microsoft® Schedule+ 7.0 and Lotus Organizer® 2.1. And the PsiWin package lets you drag and drop files from your PC to your 3c, so you can work on them wherever you go.



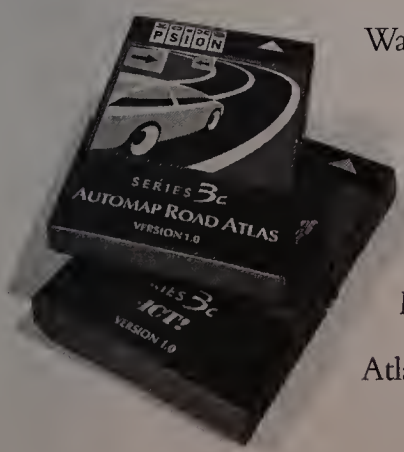
Here's to skeptics, cynics, and anyone who can see through hype.



Want to communicate? We hear you.

Hook up a modem or PC card adapter and you can send faxes. Browse the Internet. Send, receive, and reply to e-mail, even e-mail with attachments. And there's infrared data transfer that allows wireless communication with IrDA-compliant printers and other Psions. All this from a 2mb RAM palmtop that weighs under 10 ounces, runs up to 80 hours on two AA batteries, and costs just $599.

So pick up the new Series 3c from Psion. It's a palmtop computer even you can believe in. For the Psion dealer nearest you, call **1-800-99-PSION** (in Canada, 1-514-98-PSION). Or visit us at www.psion.com.



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We Want To Change The Way

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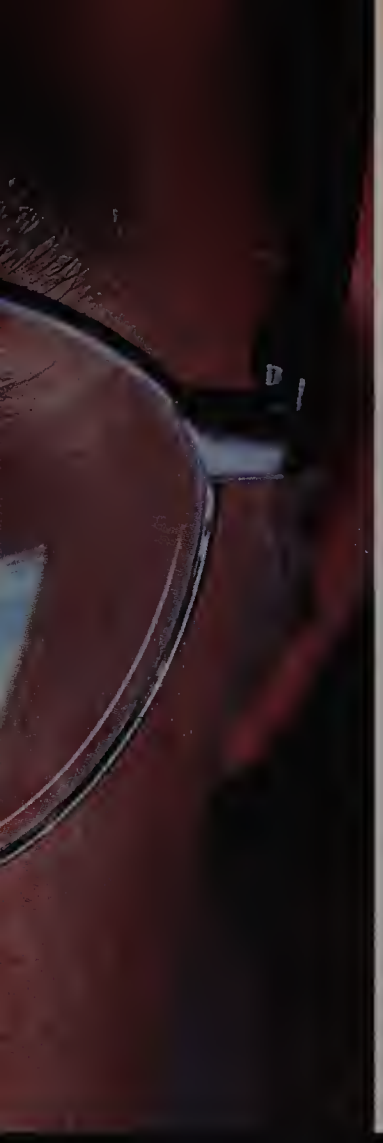
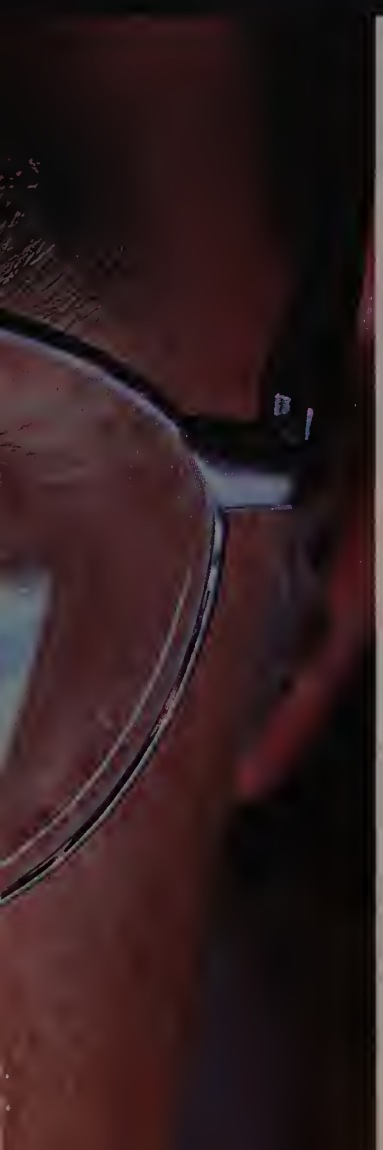


Look left. Look right. When was the last time you had to do that to see everything on your screen? We thought so. Small screens are great for hand-held TVs. But for computers running today's applications, the bigger the screen, the more information you see and, chances are, the more productive you are.

Introducing the Compaq V70 monitor.

Introducing the Compaq V70 17" (15.67" viewable) computer monitor.

U Look At Computer Monitors.



It has features that will put it high on the wish list of everyone in the company. The larger screen means applications won't have to be scrolled back and forth so much or reduced to eye-straining proportions. It also has an extremely fine dot pitch and high resolutions for crisp, sharp images and on-screen controls that allow for very easy and precise adjustments. What's more, the highest refresh rate in its price range keeps the screen flicker-free. In fact, for the money, you won't find another monitor with such an impressive list of features. Go ahead, look around. For more information, call 1-800-818-9088 or visit us at www.compaq.com.

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Fits in your budget. *For $2,499,[1] you can actually put ThinkPad power into the hands of everyone in the organization.*

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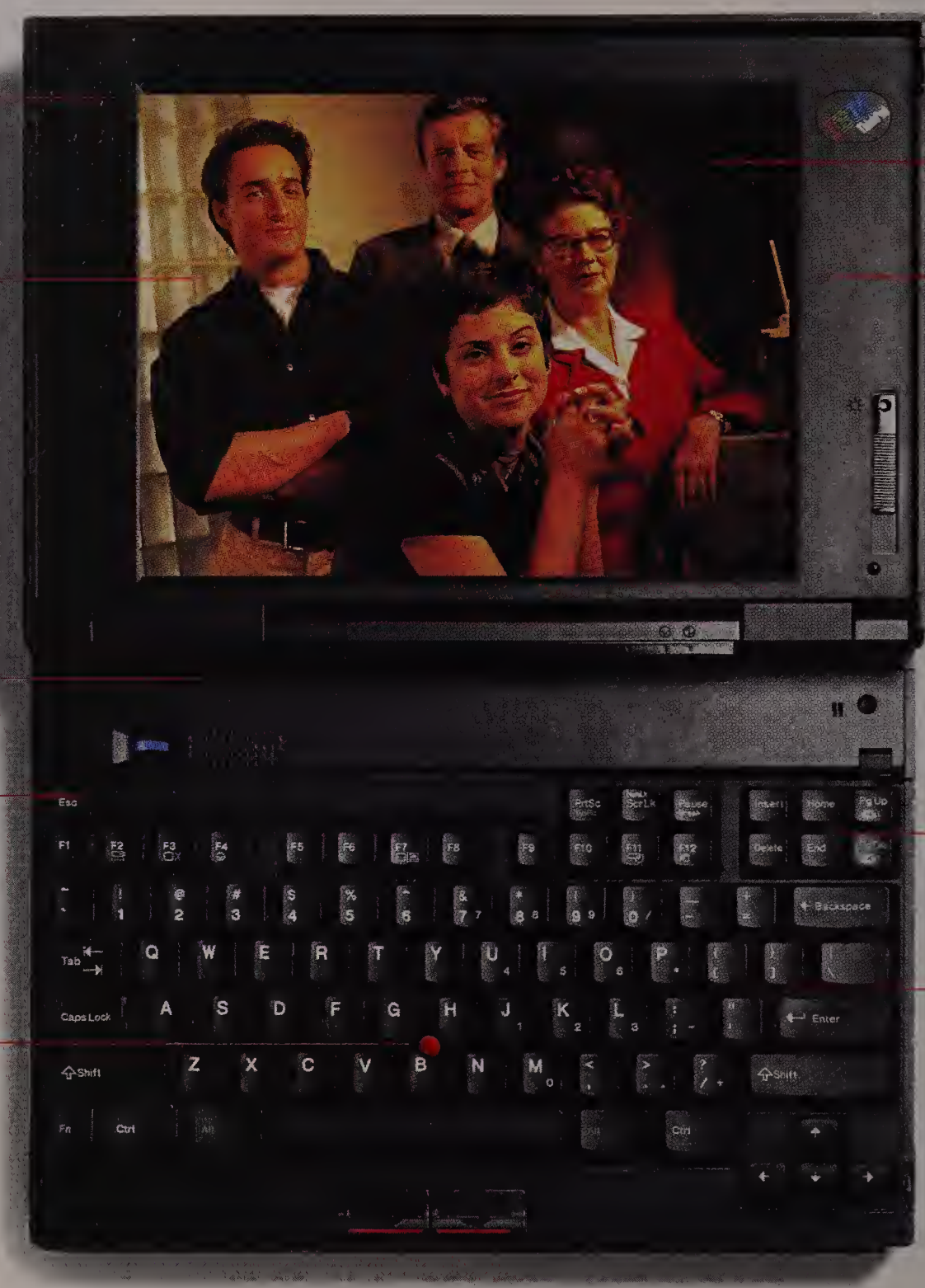

Power to spare. *With 8MB to 40MB[3] of memory and a 810MB to 1.35GB[4] hard disk, it can handle just about any business task.*

Always connected. *Two PC Card slots let you tie users to office resources, whether they're at their desks or on the road.*

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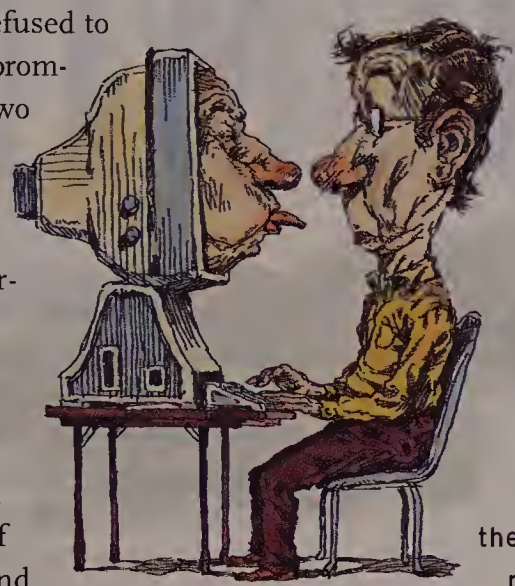
*Model 2E9/3E9. [1]Estimated IBM authorized retailer price. Actual prices may vary. Other models range up to $3,499. [2]MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance. [3]On selected models. [4]MB=million bytes, GB=billion bytes. [5]SmartSuite may be preloaded, included on a CD, or available to order on a CO. Diskettes and hard copy documentation available at extra charge. [6]M-F, 8 am-8 pm EST. In Canada, call 1 800 465-3299 (IO# 45294). Also supports Windows NT v3.51, v4.0 (when available). IBM, ThinkPad, TrackPoint III and Solutions for a small planet are trademarks of International Business Machines Corporation. Microsoft and Windows are trademarks or registered trademarks of Microsoft Corporation. Other companies, products and service names may be trademarks or service marks of others. © 1996 IBM Corp.

Mad at Maximus ◆ NEC's incompatible video card ◆ Raves for Dell's customer service

CIRCUS MAXIMUS

LAST MAY I bought a Magna Media P120 from Maximus Computers, and the sound card refused to work. Maximus tech support instructed me to reinstall Windows 95—the CD-ROM was unopened at that point. The card still refused to work, so the company promised me a new one. Two days later my system crashed; Maximus said it would send a new PC, but none arrived. After a few weeks, I asked for a full refund. I paid $1754, but Maximus will refund only $1250 because of shipping, handling, and opened software. This isn't fair. The Maximus rep told me to open the software.



Jose Vega, West Palm Beach, Florida

Editor's response: Vega was not the only reader upset with the service the Monrovia, California, company provided. In the past few months, eight other readers have complained about Maximus's unreasonable warranty policies, appalling customer support, misleading advertising, and reluctance to issue refunds for defective systems.

In addition, Monrovia's Chamber of Commerce says it has received an estimated 120 complaints about Maximus in the last two years. "For quite some time, we were not able to get Maximus to listen," says Richard Singer, executive vice president of the C of C. "Finally, after a lot of pressure, they started to communicate with us last August."

We forwarded Vega's complaint, along with those from other readers, to William Chen, Maximus's operations manager. In issuing the refund to Vega, Maximus decided to charge only for shipping and handling, since its technician had instructed Vega to open the software in the first place. Chen adds that Maximus has revised its refund policy so that customers who return systems won't be charged for opened software.

Vega confirms that he paid a total of $125 for shipping and handling. "I am satisfied that the software charge was waived," he says. "But I will never purchase anything from Maximus again."

NEC VIDEO CAPTURE LOSS

LAST JULY I ordered an NEC Versa 6030H 133-MHz notebook after the salesperson assured me that this model could capture video. I purchased an NEC video card from a distributor that NEC referred me to. The PC Card cost nearly $500, but it did not work. After I tried a few software fixes, my unit started to emit a peculiar odor and burned out. NEC replaced the notebook, but the video capture card still did not work. NEC told me there was a problem with the PC Card controller. This is outrageous. I paid nearly $6000 so I could have a high-end system with this function to use in my teaching.

Patrick Douce, Big Sur, California

Editor's response: Sure enough, the user guide for NEC's VersaVideo Portable Digital Card clearly *says* that it works with the Versa series notebooks. But it doesn't. We spoke with D. J. Anderson, NEC's senior manager of public relations, and she acknowledged that a compatibility problem exists between the Versa 6030H notebook and the Versa Video card. "Unfortunately, we did not find this problem during our testing procedure," says Anderson. She assured us that NEC was fixing the problem but could not specify when the patch would be available. "NEC apologizes to Mr. Douce and offers him a complete refund," she says. However, Douce is not happy with this solution. At press time, NEC was still attempting to resolve the issue.

GOOD DEALS ON DELL SYSTEMS

MY NOTEBOOK WAS stolen in December 1995, and I needed a machine in a hurry—one that *didn't* have Windows 95, as the software I used wasn't compatible with Windows 95. I was told to forget it—Win 95 or nothing. However, I called Dell and they custom-built an LX-4100 to my requirements. When I had to replace my home PC last May, there was no question—Dell all the way. I got an even better deal on an XPS-P166 than was advertised. I'm very satisfied with Dell's prices and its customer service.

Pete Dazer, Westland, Michigan

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Aoife McEvoy is an assistant editor for* PC World. ■

ILLUSTRATION: JOHN CUNEO; ICON: JEFFREY PELO

THE FINE PRINT

FREE TO ROAM ON THE INFORMATION HIGHWAY?

IF YOU'RE SHOPPING for an online service, expect to be enticed by promises of free hours. The fine print in this CompuServe ad reveals some costs you might not anticipate.

1. You get "10 free hours" the first month only. After you exceed this limit, each extra hour costs $2.95.

2. After the first month, you pay $9.95 per month and get "5 free hours." But with the $9.95 cost, the 5 hours are not really free—you pay nearly $2 an hour.

3. The advertised free time applies only to basic services—expect to pay if you request financial quotations or enter health-related or other premium areas. The charge for each premium service can range from 3 cents to $300, depending on the vendor and your activity.

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new
low price of
$199
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- Ideal for high resolution, true color, and 3D Gouraud shading applications
- 2 - 8 MB of dual ported Window RAM memory
- Up to 1600 x 1200 in 16.7 million colors
- 220 MHz DAC for 85Hz at up to 1600 x 1200
- New improved MGA Powerdesk utilities for Windows NT 4.0 and Windows 95
- Upgradeable with the Media series for hardware MPEG playback and TV on the PC
- Bundled with a software MPEG player, color calibration software, Netscape Navigator, and more
- Starting at $199 (ESP 2 MB)

Winbench 96 1024 x 768 at 24-bit	
Matrox Millennium	36 M
Number Nine Imagine 128-2	29 M
STB Lightspeed 128	Not supported

24-bit color

All the speed you need

From the world renowned Matrox Millennium to the explosive new Matrox Mystique, you'll finally get all the speed you need and more. Both Millennium and Mystique deliver blazing fast acceleration for 3D, Windows, video and DOS. Their unique all-in-one design combines award-winning MGA 64-bit graphics chips and powerful memory types so you get the highest possible performance no matter what your needs.

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If you're looking for the fastest graphics acceleration for your professional applications, Millennium is the clear winner. Millennium's dual-ported Window RAM memory maintains high system performance even as you increase to maximum resolutions, color depths and refresh rates. As the professional's choice in accelerators, Millennium has won over 50 international awards and is included in high-end Pentium Pro systems from Compaq, Gateway, Hewlett Packard, IBM, and many more!

	Direct 3D Tunnel Test	Direct 3D Game Speed	Full PCI Bus Mastering	H/w True Perspectiv Correct Texture Mapping
Matrox Mystique®	55	25	✔	✔
ATI 3D Xpression	25	NA [1]		
Diamond Stealth 3D 2000XL	23	14		✔

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In Quebec, call: 514-969-6330

All Winbench 96 and Direct 3D tests conducted on Sept. 6, 1996 by Matrox Graphics Inc on a Geteway P5-166 configured with Intel P5-166Mhz, 16MB of EDO RAM with 256K cache. The Matrox Millennium and Number Nine Imagine 128 Series 2 were configured with 4 MB of memory using driver releases 3.12 and 2.09 respectively. The STB Lightspeed 128 was configured with 2.25 MB of memory using driver release 1.22i, and could not be expanded to support 1024 x 768 @ 24-bit. Matrox Mystique, Diamond Stealth 3D 2000XL and ATI 3D XPRESSION were configured with 2 MB of memory for the PCI bus using driver releases 3.12, 4.03.00.2101 and 2.22 respectively for Windows 95. WinBench 96 1.0 tests conducted at 1024 x 768

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WS & VIDEO

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Matrox's high quality upgrade modules redefine video on the PC. You'll be able to send video over the internet, play PC games on the big screen TV, decode MPEG video in hardware, watch TV on the PC, and a whole lot more! Explore all the possibilities at an incredible price.

Get the fastest of the fast with a Matrox product. Call or visit our web site to find out which card or upgrade is right for you.

8-bit Palettized Textures	3D Z-Buffering	Memory Upgradeable	1600 x 1200 Non-Interlaced
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- Ideal for mainstream Windows, 3D texture mapped games, video, and DOS applications
- 2 - 4 MB of fast single ported SGRAM memory
- New! Up to 1600 x 1200 in 65,000 colors
- New! 170 MHz DAC for flicker-free displays
- Also includes MGA Powerdesk utilities for Windows
- Upgradeable with add-on modules for hardware MPEG, playing games or watching presentations on TV, frame capture, and watching TV on the PC (Q1 '97)
- Bundled with a software MPEG player, 3D web browser plug-in, and three 3D games: Mech Warrior™2, Destruction Derby™2 and Scorched Planet™
- Starting at $179 (ESP 2 MB)

8-bit color

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resolution with 8-bit and 24-bit color at 75Hz refresh using large fonts under Windows 95. ATI has not released Direct 3D drivers for the 3D Xpression therefore drivers provided on the Microsoft DirectX 2.0 SDK were used. © Monster Truck Madness Microsoft Corp. Monster Truck Madness was tested in first person view, with dashboard off, map off, sky texture on, horizon on, smoke effects on, image quality high, texture normal,scenery complex, shadow normal, smoothing on, tire, tracks and particles. Test conducted at full screen 640 x 480 @ 16 bit. Direct 3D tests done using Tunnel from the DirectX 2.0 SDK. Diamond Stealth 3D 2000XL and ATI 3D Xpression tests were conducted at 512 x 384 @ 16 bit while Matrox Mystique tests were conducted at 640 x 400 @ 16 bit based on Gouraud shaded, perspective correct textured, point sampled, 16-bit per pixel color, dithered rendered polygons. (1) Game failed when executed on ATI 3D Xpression

matrox

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MultiSync MT800
12.7"w x 5.9"h x 16.0"d, 17.6 lbs.

With their extraordinary lightweight design, the new MultiSync® MT600 and MT800 projectors can go anywhere you can go. Down the hall, or down the road.

And thanks to their uncanny ability to project bright, crisp and evenly illuminated images, you no longer have to sacrifice image quality for portability.

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MultiSync MT600
12.7"w x 5.9"h x 16.0"d, 15.9 lbs.

All you have to do is plug in a source, which, due to simple connectivity and compatibility, can be anything from a notebook computer to a VCR.

Now, shouldn't you explain all this to your coworkers? They're still wondering why you strolled past the water cooler holding this magazine out in front of you. To find out how to get a hold of the real thing, call 1-800-NEC-INFO.

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NEC

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Circle 176 on reader service card

NT could bug out on data ◆ Crashing at Warp 4.0 ◆ Feel better with First Aid update

First Bug Bites Windows NT 4.0

THINKING OF SWITCHING to Windows NT for its better file system and data security? Stop by Microsoft's ftp server for a patch first. NT 4.0 (both Server and Workstation versions) had been on shelves only a few weeks when a potentially disastrous file system bug was discovered that can discard data instead of writing it to disk. Microsoft discovered the problem while beta-testing the Microsoft News Server, codenamed Normandy (downloadable from http://www.microsoft.com/internet/normandy).

According to the company, the bug crops up only under specific circumstances—multiple program threads must be both reading and writing to a small file (a text log file, in the Normandy news server's case), and the file writes must be cached. Fixes for all processor versions (Alpha, Intel, MIPS, and PowerPC) have been posted to ftp://ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/NT40/hotfixes-preSP1/krnl-fix/. By the time you read this, the patch may be included in Windows NT Service Pack 1 (current NT Service Packs are available at http://www.microsoft.com/kb/softlib/winnt.htm).

While we're on the subject of NT 4.0 glitches, here's something to avoid: Microsoft inadvertently left a program called rollback.exe on the NT 4.0 Workstation and Server CD-ROMs. It allows vendors to install NT on a PC for presales testing, then "roll the installation back," removing all NT configuration information, including user accounts and passwords. For this to happen, you must be logged on as Administrator and you have to find the program on the CD-ROM (it's in the \Support\Deptools\I386 directory), a fact that didn't prevent several NT administrators from crashing their networks, according to Usenet postings.

WARP 4.0 ISN'T SPARED, EITHER

ACCORDING TO INDEPENDENT OS/2 software developers, a last-minute change in the OS/2 Warp 4.0 programming interface can crash programs that run successfully under earlier versions of the operating system, create problems in the OS/2 desktop, and even crash OS/2 itself, wiping out any unsaved data. IBM is considering creating a patch that allows existing programs that trigger the error to run under Warp 4.0. Fixes for earlier versions of OS/2 are available at http://ps.software.ibm.com/pbin-usa-ps/getobj.pl?/pdocs-usa/allos2.html; check here for Warp 4.0 patches.

FIRST AID 95 GETS BETTER

IF YOU USE VERSION 2.0 or later of Cybermedia's diagnostic program First Aid 95, you'll want the latest patch from the company's Web site (http://www.cybermedia.com/help/updfa.htm). Cybermedia says the update improves First Aid's ability to trap 32-bit General Protection Faults and supports more sound boards and hard disks. The update provides detailed knowledge of the components installed and used by 104 commercial programs, compared to only 34 in version 2.0. Prepare for a lengthy download, though—the patch, available in four parts or as a single download, totals 4.8MB. If you use First Aid 95 Deluxe, find the 6.3MB update at http://www.cybermedia.com/help/updfad.htm.

IN BRIEF

Lantastic and ModemShare Updates

The file nos700.exe contains fixes for minor bugs in Lantastic 7.00, including the inability to remove Internet gateway software, lockups after changes to server configurations, and more. The file msr700.exe fixes problems in the ModemShare application, including ZMODEM upload lockups, incompatibilities with Windows 95 Dial-Up Networking Scripter, Microsoft Fax, WinFax Pro 7.0, and the IPX networking protocol. Find both files at http://www.artisoft.com/lan/tech/updates.html.

New U.S. Robotics Address

The Web address for the U.S. Robotics' WinModem 33.6 Upgrade reported in September's Bugs and Fixes has changed. The new URL is http://www.usr.com/home/online/files/dl07.htm.

Compaq Presario MediaPilot Patch

BUG The phone rings, and it's a fax machine calling. You click the Manual Fax Receive button in your Compaq Presario's MediaPilot 1.7i telephony application, but no fax appears. To make matters worse, after playing back a few voice messages, which MediaPilot kindly blasts at top volume, you realize that the program has also cranked the computer's wave audio to the max.

FIX Compaq has released a patch that resuscitates manual fax reception and turns wave volume down after message playback. The company says the MediaPilot problems occur only on Presario models 5200, 5500, 7200, 7600, 9200, 9500, and 9600. Download the self-extracting, self-explanatory archive file sp1877.exe from Compaq's Web site at http://www.compaq.com/support/files/swDesktops.html. ■

BUGGED?

If you find a hardware or software bug, post your report on PC World Online, or send us e-mail at bugs@pcworld.com

ICON: JEFFREY PELO

{See How Business Travels}

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Dynamic sound, quality stereo speakers, microphone, and MPEG 1 support enhance multimedia presentations

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Advanced six-speed CD-ROM unleashes the power of multimedia with sound, video, text and graphics

intel inside pentium PROCESSOR

*On select models.

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Lightweight, removable battery provides up to 4.5 hours of battery life to keep you going

intel inside pentium® PROCESSOR

*On select models.

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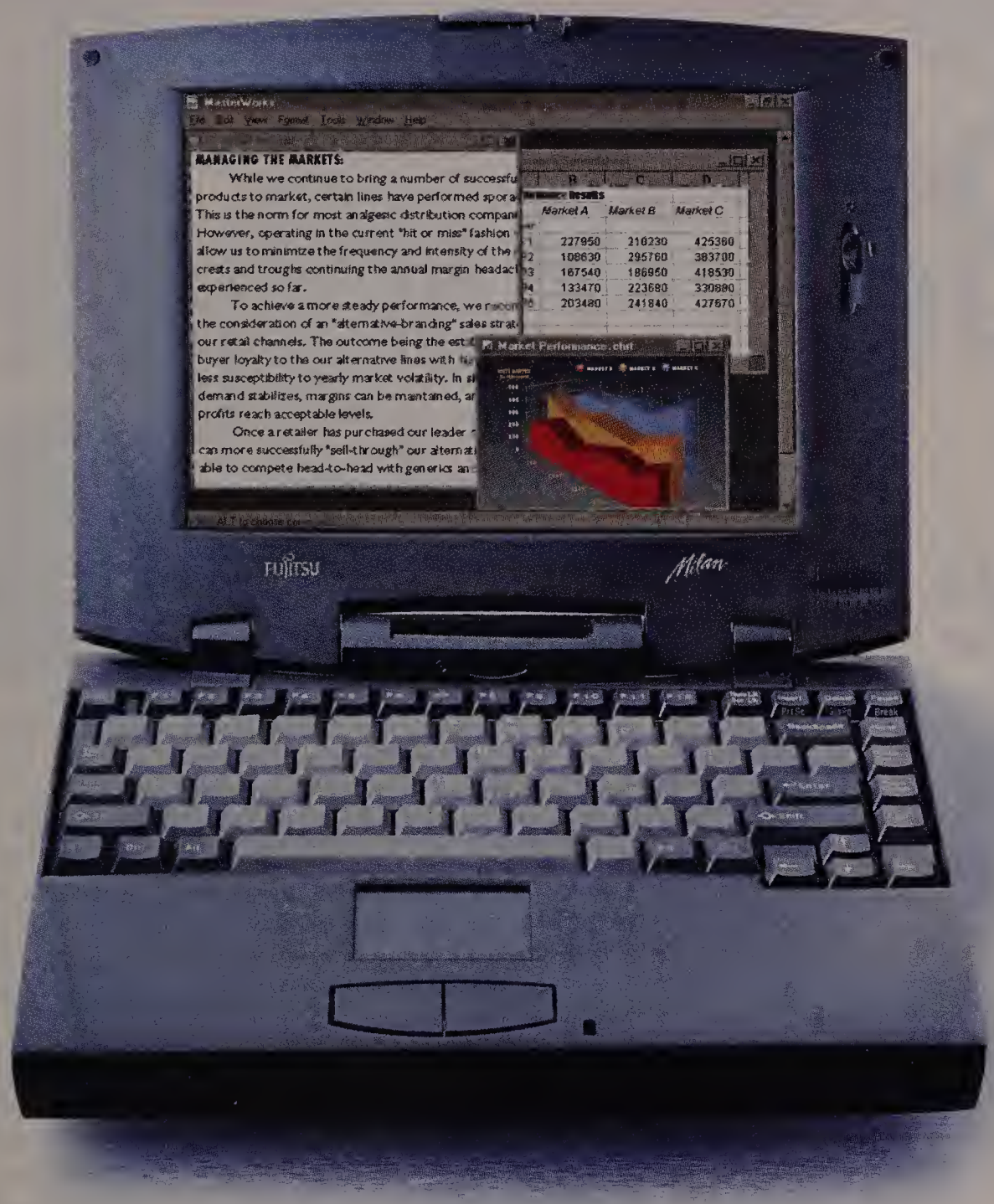

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TOP OF THE NEWS

The Battle of the Brands

New home PCs from **Toshiba** and **Sony** mark the **latest step** towards the convergence of **PCs and TVs.** Behind the flashy features is solid **performance**—and tech support that needs **improvement.**

SONY's PCV-90 offers solid performance in an easy-to-set-up box that's loaded for work and fun.

TWO OF the biggest brands in consumer electronics—Sony and Toshiba—have jumped into the home PC market with strikingly innovative systems. They are designed to be as easy to set up and use as household appliances and, particularly in the case of Toshiba, to merge the worlds of home entertainment and computing.

Beyond the sweeping designs you'll find solid computers that aim for reliability and ease of use. To quell the fears and frustrations of technophobes and novices, the manufacturers back these products with the promise of superior technical support.

DO THEY DELIVER?

HOW SUCCESSFUL are these attempts at convergence? We looked closely at two systems,

THE BEST of both worlds: Toshiba's Infinia 7200 includes a TV tuner, an FM radio, and a 200-MHz Pentium.

the PCV-90 from Sony and the Infinia 7200 from Toshiba. We found innovative PCs with average performance for their class and above-average price tags—$2799 for the Toshiba, $2899 for the Sony. We also found really fun features.

For example, Toshiba's Infinia 7200 includes a cable-ready TV tuner and FM radio card that you control with a handheld remote and a fancy LCD display. Sony's hot new feature, a high-performance software-based MPEG decoder, plays specially compressed MPEG files as well as most hardware decoders do.

If the home PC is to become an appliance, it needs to be easy to use and offer superlative technical support. The PCV-90 and the Infinia 7200 are a snap to set up, and the Sony has an excellent user interface. But support is another matter. Despite some innovative support technology and claims of superior service, we found technical help uneven.

MY FIRST SONY PC

SONY OFFERS two models: The PCV-90 comes with a Pentium-200 processor, a 2.5GB hard drive, and 32MB of EDO RAM; the PCV-70 has a P-166, a 2.1GB hard drive, and 16MB of RAM. Both have 256K of secondary cache, an 8X CD-ROM drive, and a 14.4/28.8-kbps DSVD fax-modem. Sans monitors, they're priced at $2899 and $2499, respectively.

We tested the PCV-90 which for the most part looks and acts like most other PCs. Designed to blend in with your home electronics gear, the gray minitower case features a conspicuous purple cover that slides over the floppy and CD-ROM drives. The cover is clumsy to use but should keep curious toddlers at bay.

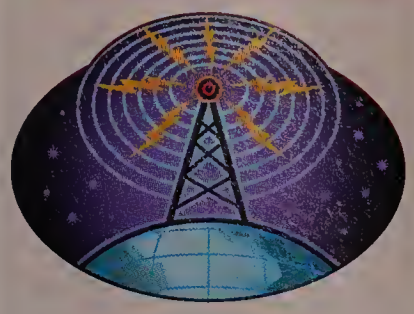
It costs extra, but Sony's CPD-100VS monitor is an integral part of the package. It has 1280 by 1024 resolution and a flat Trinitron screen. Volume controls for the answering machine and speakerphone are mounted on the front. Integrated on the sides are two 3.5-watt speakers and a microphone. A 10-watt subwoofer is nestled in the monitor's stand. The unit produces better than average sound for a PC system.

At press time, the $579 15-inch CPD-100VS was the only monitor available, and ▶

EDITED BY
Russell Glitman and Randy Ross

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION, UPPER RIGHT, AND ALL ICONS: JEFFREY PELO

JUST IN



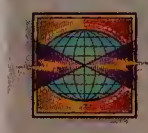
Standard Modems to Hit 56 Kilobits per Second

EARLY NEXT YEAR, vendors expect to ship modems that will let you download data over a standard phone line from the company LAN or the Internet at up to 56 kilobits per second—almost twice as fast as today's 33.6-kbps modems permit. Currently, this level of performance requires an expensive phone service called ISDN, which is not available in many areas. Though you won't need a special phone line with the new modems, the site you're dialing must have a digital connection to its local carrier and compatible 56K hardware. Also, 56K performance is limited to downloading. The modems should cost about $400.

Retrieve E-Mail With a Telephone

PURESPEECH'S Juggler program enables your PC to recite e-mail and play back voice messages over the phone. When reading e-mail, it uses a computerized voice. Juggler works with Internet and CompuServe e-mail and should save time for those who work at home but travel frequently. Juggler is expected to ship in the first quarter of 1997. It requires a PC with Windows 95, 16MB of RAM, a Pentium processor with MMX multimedia capabili- ▶

INTERNET



TO GET UP-TO-THE-MINUTE NEWS, including the latest reports from Fall COMDEX, and to see a 3-D walk-around of Toshiba's Infinia, check out PC World Online. Just point your browser to http://www.pcworld.com/news.html.

Sony would not say when customers would be able to buy a 17-inch version.

Graphics get a boost from the ATI Mach 64 chip, accompanied by an ATI 3D Rage accelerator chip on the motherboard. Special editions of two games that have been tuned for the Rage chip—Mech Warrior 2 and WipeOut—are featured in a software bundle. The bundle also includes Microsoft Works, Quicken SE, and Compton's Interactive Encyclopedia.

SOLID PERFORMANCE

WITH A PC WorldBench score of 212, the PCV-90 lands squarely in the middle of the performance range for similarly configured Pentium-200 systems. But make no mistake, this system is still faster than most on the market. And in our ease-of-setup test for the Top 5 Home PCs, the Sony achieved the highest score we've seen. Well-written directions, clearly labeled and color-coded cords and connectors, and a generally well thought out design make the out-of-box experience fast and easy.

DETAILS

TOSHIBA USES color codes and icons to cut setup time to minutes. The bottom slot is occupied by a cable TV tuner and an FM radio card.

Another plus for less-experienced users is Sony's new interface, the VAIO Space. Using this 3-D interface is like looking into a room. When you first boot the machine, the VAIO Space displays a video wall and a striking animated video. Other walls let you control audiovisual features, launch applications, and go online.

SONY SUPPORT SNAFU

SONY ONLINE Support service offers excellent technology, but the support staff still needs training. The bundled Radish Communications' VoiceView TalkShop software, which uses the PCV-90's DSVD modem, lets you simultaneously talk and transfer data over a single phone line. This capability lets Sony's technical support staff speak with you while troubleshooting your PC. They can also download files and data from your PC—with your permission.

We tested SOS by calling a technician and asking him to take a look at our autoexec.bat file, from which we had removed a single line. Making the connection was easy—a click on the SOS icon in VAIO Space brings up the ready-to-dial speakerphone. A few seconds later, we found ourselves speaking to the technician while he downloaded the file.

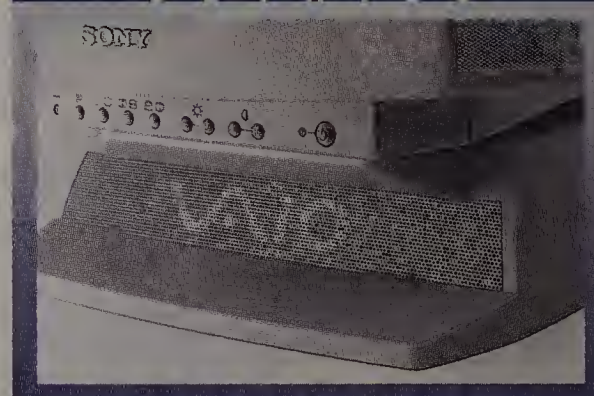
At first he wanted to fax us a copy of the complete autoexec.bat file so we could make the changes ourselves. When we insisted he upload the corrected file, he sent us the autoexec.bat file from his own PC!

Calls to other Sony technicians weren't quite as unsettling but underscored the need for better training.

TOSHIBA TV

TOSHIBA, WHICH has long been a major player in the notebook market, now offers three Infinia PCs for the home and plans to introduce business models early next year. System design is striking. The series begins with the 7130, a Pentium-133 system that costs $1699 without a monitor. It has 16MB of EDO RAM and a 1.5GB hard drive. One step up is the $1999 Infinia 7160 with a Pentium-166, 16MB of EDO

DETAILS



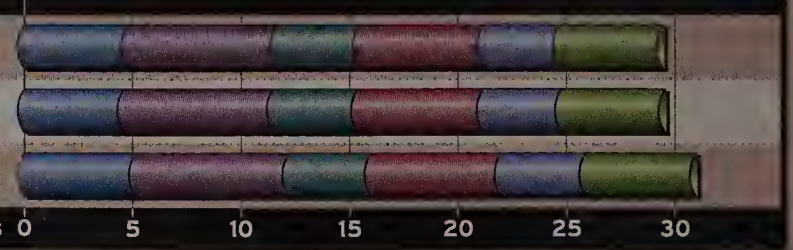
AT YOUR FINGERTIPS: All the adjustment controls for the Sony are available from the front of the monitor. Speaker grill is at bottom.

TEST REPORT

You Can Judge These PCs by Their Covers

Latest PCs from Sony and Toshiba look cool and deliver solid performance.

SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
Average of five Pentium-200 PCs	Pentium-200	32	256	212
Sony PCV-90	Pentium-200	32	256	212
Toshiba Infinia 7200	Pentium-200	32	256	201



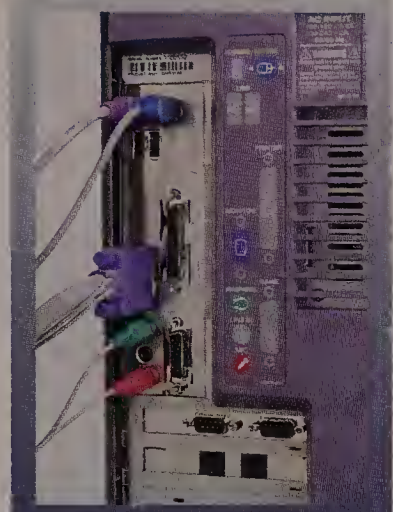
Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST Higher PC WorldBench scores are better. For a description of PC WorldBench 1.0 tests, see PC World Online (http://www.pcworld.com). Data based on PC WorldBench testing conducted by the PC World Test Center. All rights reserved.

RAM, and a 1.9GB hard drive. Each model comes with an 8X CD-ROM drive and a 28.8-kbps modem that is upgradable via software to 33.6-kbps. The software bundle includes Microsoft Works, Quicken SE, Encarta 96, and Sim City 2000. Neither model comes standard with the TV tuner/FM radio card, which costs $200 additional.

We tested the high-end Infinia 7200, which sells for $2799 and has a Pentium-200 processor, 32MB of EDO RAM, and a big 3GB hard drive. The 7200 comes with a 125-channel cable-ready TV tuner and FM radio capture card, a handheld remote control, and hardware wavetable audio for high-quality sound.

DETAILS



COLOR-CODED plugs and icons make the Sony setup easy. A DSVD modem allows simultaneous transmission of both voice and data.

to set up. But oddly, the Infinia has no custom user interface.

TOSHIBA TELEVISION

TOSHIBA'S real innovation for the Infinia 7200 is the InTouch Module. Several home PC vendors, most notably Compaq, have begun putting telephony and audio-visual control buttons on the front panels of their PCs. But the detachable InTouch Module lets you control multiple devices—from the answering machine and audio CD Player to the TV—with a 5-by-1-inch LCD screen.

DETAILS

HI-FI COMPUTING: You get great sound from the Toshiba's speakers; a panel on the monitor lets you control the TV and the FM stereo.

Toshiba's 17-inch monitor costs $749 and has built-in 5-watt speakers on each side, a 5-watt subwoofer below, and a microphone. The 15-inch model sells for $449 and lacks the subwoofer. The Infinia 7200's 3-D sound system is great—far better even than the Sony's.

The Infinia 7200's performance, like the Sony's, rates in the middle of the pack for similarly configured Pentium-200 systems. And like the Sony, the Infinia has clear-cut instructions and a thoughtful design that make it very easy

How did the TV work? Better than expected. Past experience with TV boards in PCs left memories of hard-to-use interfaces and poor image quality. The TV was easy to use from the remote control and from push buttons on the In-Touch Module. The viewing window toggles easily between full and partial screen. Image quality is fine. But if you really want a TV-capable computer as the centerpiece of your living room, you may prefer the 31-inch screen of Gateway 2000's Destination TV-PC. The Infinia is better suited to den, bedroom, or dorm.

We placed four calls to Toshiba's tech support line. Each time we waited at least 15 minutes to reach a technician. On the first call, the technician told us the number in the manual was wrong, then connected us to the "proper" line. Toshiba later told us the technician was mistaken. As with Sony, Toshiba's tech support system needs improving.

PC FOR THE HOUSE?

IS IT WORTH paying a premium for these systems? Yes, particularly for the Toshiba. Both offer solid performance, easy setup, and intelligent design that make them ideal home systems, especially if tech support improves.

—*Kirk Steers* ▶

Sony PCV-90

PRO: Very easy setup, great custom interface.

CON: Tech support needs help.

VALUE: From box to desktop in just minutes.

List price: $2899, 15-inch monitor $579

Sony Electronics 800/476-6972

http://www.sony.com

READER SERVICE NO. 854

Toshiba Infinia 7200

PRO: TV and FM radio, easy setup.

CON: No custom interface, inconsistent tech support.

VALUE: Entertainment Tonight with Windows 95.

List price: $2799, 17-inch monitor $749

Toshiba 800/334-3445

http://www.toshiba.com

READER SERVICE NO. 855

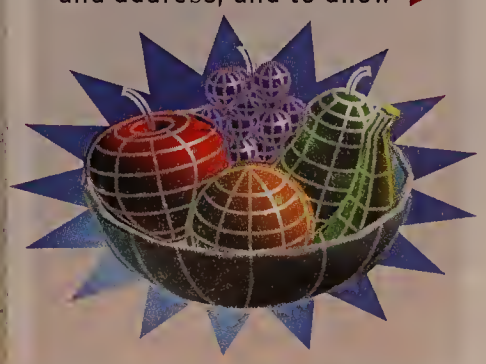
ties, and a modem that supports Juggler's voice features. The products will initially be bundled at no cost on MMX systems.

Buying Software Online to Get Easier?

THE SOFTWARE Publishers Association has unveiled guidelines designed to simplify buying software over the Internet. One policy calls for software resellers to standardize and reduce the amount of information purchasers must provide. Currently, resellers tend to ask a lot of questions as a way of conducting some quick-and-dirty market research. Other guidelines recommend pricing options, such as letting customers pay each time they use a piece of software instead of buying it outright. The guidelines also cover privacy issues, such as letting customers decide if they want to receive junk e-mail.

Privacy Assured

TO PROTECT the privacy of Web surfers, a group of Internet companies has launched a program called Privacy Assured. To receive the Privacy Assured endorsement, which will appear as a logo on a Web page, site owners must agree to a series of commitments. They must pledge not to knowingly list information about individual users without prior consent, or release usage statistics that can be used to identify individuals. They must also agree to block reverse searches that can retrieve a user's name and address, and to allow ▶



ILLUSTRATION, LOWER RIGHT: JAMES GARY

Upgraders Choice: Microsoft Office 97 Versus Lotus SmartSuite 97

BETA

TRADITIONALLY, Microsoft and Lotus have upgraded their application suites by heaping on features that many people didn't need. This time, both vendors skipped the buffet-style approach and focused on ease of use, Internet and collaborative tools, and small but useful improvements to flagship applications. Based on our evaluation of prerelease versions, both Office 97 and SmartSuite 97 are worth the upgrade price. For people choosing their first Windows 95 suite, Office 97 has the upper hand in terms of overall integration, help system, and application features.

But Office 97 is also more expensive. The standard version costs $500; upgrades will be less than $250, Microsoft says. SmartSuite will sell for $400; the upgrade will cost $150. Neither SmartSuite nor Office can approach Corel's $99 competitive upgrade price for WordPerfect Suite 7, available to owners of any suite, word processor, spreadsheet or presentation product.

INTERNET INTEGRATION: Beta tester David Beckman gives kudos to SmartSuite 97's Internet features that update him on news events.

SmartSuite 97 and Office 97 are late to market but should be available by January 1997.

MICROSOFT OFFICE 97: THE EARLY LEADER

WE REVIEWED a beta copy of the Standard version of Office 97, which includes Excel 97, Internet Explorer 3.0, Outlook 97, PowerPoint 97, and Word 97.

The first thing you'll notice: Microsoft has greatly improved the help system. The Office Assistant, an animated character, leads you through tasks and answers questions posed in plain English. (If the character is too cute, you can just turn it off.)

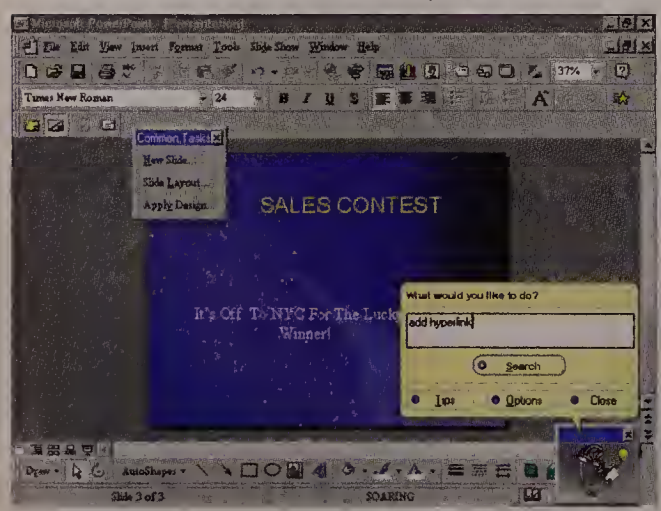
Many new features simplify work with the Internet and intranets. For example, you can hyperlink Office documents to each other or to Internet sites, and save Access, Excel, PowerPoint, and Word documents in HTML format. Word 97's Web Page Wizard and text animation help create online documents. New collaborative features in Excel, PowerPoint, and Word fill a gap in this suite, helping it catch up with SmartSuite. In Word, for example, you now can control a document's versions, color-code each writer's work, and merge versions.

Microsoft also made small, smart changes to Excel and Word. For example, you can write formulas using plain English and easily adjust page breaks. Word 97 now includes a grammar checker that flags problems on the fly. The new application, Outlook 97, combines e-mail, scheduling, and contact and task management. We like the e-mail, but as a PIM, Outlook is too complex for some people. Another negative: Microsoft omits Access 97—its database—from the Standard version of Office. (Lotus bundles Approach in its suite.) Microsoft had not finalized Office 97's size at press time, but we expect it will require about 110MB for a typical install, 150MB for the complete install—about 10MB to 20MB more than Office 95.

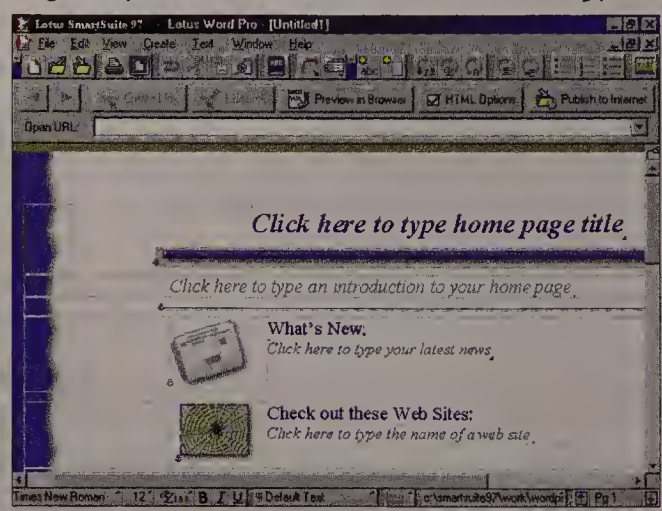
SMARTSUITE 97: IMPROVEMENTS INCLUDE NEW 1-2-3

SMARTSUITE 96 had an incomplete roster—new 32-bit versions of Approach, Freelance Graphics, and Word Pro were mixed in with 16-bit versions of 1-2-3, Organizer, and ScreenCam. SmartSuite 97 fixes that problem.

On the Internet front, Lotus almost keeps up. Word Pro's Web Page Publisher lets you create Web pages quickly but makes you launch a separate browser to view the page. 1-2-3



OFFICE 97 APPLICATIONS such as PowerPoint let you add hyperlinks easily. An Office Assistant (icon at bottom right) answers questions posed in plain English.



LOTUS WORD PRO 97'S Web Page SmartMaster lets you fill in the blanks to make a Web page. But you must launch a browser to see how the page will look.

JAMES VISSER

SEPARATING THE HOT FROM THE NOT

MICROSOFT OFFICE 97	LOTUS SMARTSUITE 97
Standard version: Excel 97, Internet Explorer 3.0, Outlook 97, PowerPoint 97, Word 97	1-2-3 97, Approach 97, Freelance 97, Organizer 97, ScreenCam 97, Web browser (to be determined), Word Pro 97
What's Hot	**What's Hot**
Internet features: formatting to HTML, hyperlinks to Office documents and Internet sites, integration with Explorer 3.0 browser, Web page creation wizards	Internet features: formatting to HTML; hyperlinks to Internet sites; SmartCenter tracks news, weather, and stocks
Word 97: collaborative features	Word Pro 97: improved performance
Excel 97: plain-English formulas, Chart Wizard, collaborative features	1-2-3: outliner, print preview, AutoTotal
Outlook 97: integrated scheduler and e-mail in-box	Organizer 97: launch to Web sites from Notepad
PowerPoint 97: new content templates, group comment feature	ScreenCam 97: connect multiple segments
What's Not	**What's Not**
Standard version is pricey	1-2-3 doesn't check spelling automatically
Outlook contact manager is complex	Some 1-2-3 Team tools require Notes
No database in standard version	Web page creation not seamless

users can publish a range of data to the Web and open files from a Web or FTP site. "Internet integration has really pushed us to use the Lotus suite," says beta tester David Beckman, a lawyer at the law firm Beckman and Hirsch in Burlington, Iowa. "It's really easy to use." The SmartCenter feature lets Beckman read updated news and stock quotes.

After nearly two years on the launchpad, 1-2-3 for Windows 95 has arrived, sporting an outlining tool similar to Excel's. You also can add comments to a worksheet cell, and print-preview and edit a worksheet at the same time. On the downside, 1-2-3 doesn't check spelling automatically or include Word Pro's Ask the Expert help system. 1-2-3 has the Lotus collaboration tools TeamConsolidate, which requires Notes, and TeamReview.

SmartSuite 97 includes a number of overdue features. In Word Pro 97, you can add watermarks, create drop caps, and link multiple frames. ScreenCam lets you edit movies by creating multiple segments, which you can then rearrange. SmartSuite 97 requires 110MB for typical installation and 175MB for maximum install—slightly bigger than the last version.

PERFORMANCE: THE BOTTOM LINE

WINDOWS 95 suites' past performance has been mediocre. Overall, in our informal evaluation, both new suites performed about the same as their predecessors.

Office 97 is ahead of SmartSuite 97 in terms of features. Look for final recommendations after we test shipping versions.

—Laurianne McLaughlin and Cathy Kenny ▶

Microsoft Office 97

PRO: Clever help features, Internet integration, collaborative tools, many small timesaving application improvements.

CON: Some versions pricey, no database in standard version, Outlook may be too complicated for some.

VALUE: Based on prerelease evaluation, the upgrade is worthwhile.

Street price: Standard version $500, upgrade under $250

Microsoft

800/426-9400

http://www.microsoft.com

READER SERVICE NO. 856

SmartSuite 97 for Windows 95

PRO: A good value, all apps now 32-bit, Internet integration, productivity tools.

CON: Weaker Web-page creation and fewer help features than Office 97.

VALUE: Not perfect, but worth the upgrade for Lotus diehards.

Street price: $400, upgrade $150

Lotus Development

800/343-5414

http://www.lotus.com

READER SERVICE NO. 857

ILLUSTRATION: JAMES GARY

individuals to remove personal information if they wish.

Internet Explorer on a Roll

PRODIGY AND AT&T WorldNet have made Microsoft's Internet Explorer 3.0 the default browser for their online services. In return, Microsoft will include both services in an Information Service folder that will appear in an upgrade to Windows 95 due in February. **The announcement spells trouble for Netscape Navigator.** Although Netscape controls about 80 percent of the browser market, the major online players—CompuServe, AOL, Prodigy, and AT&T WorldNet—have chosen Internet Explorer as the default browser for their services.

TidBytes

SYMANTEC'S NEW Windows 95 Utility: Healthy PC is designed to help novices use a mouse to maintain their PC. The $29.95 package combines basic versions of Norton's AntiVirus and Speed Disk utilities with extremely simple interfaces. **Tough Notebooks, Tender Price:** Panasonic's CF-25, a fully water-resistant unit encased in magnesium alloy, comes with either a P-100 processor ($3329) or a P-133 ($3869). Ruggedized notebooks typically cost up to $10,000. The CF-25 weighs 7.5 pounds—light by ruggedized notebook standards—and it features a 10.4-inch screen, 8MB of EDO RAM, and a nickel-metal hydride battery.

Money and Quicken Face Off Again—Bottom Line: They're Both Great Programs

IF YOU'RE not using a personal finance package, you're running out of excuses. The latest editions of Microsoft Money and Intuit's Quicken are full 32-bit applications, easy to set up and use, with online links and lots of help.

Both Money 97 and Quicken 6 Deluxe for Windows are packed with ideas for reducing debt and taxes, choosing mortgages, putting kids through college, and many other topics. Both smooth the way to the online world, with easily set-up links to the World Wide Web for investment information and to the now ubiquitous world of online banking.

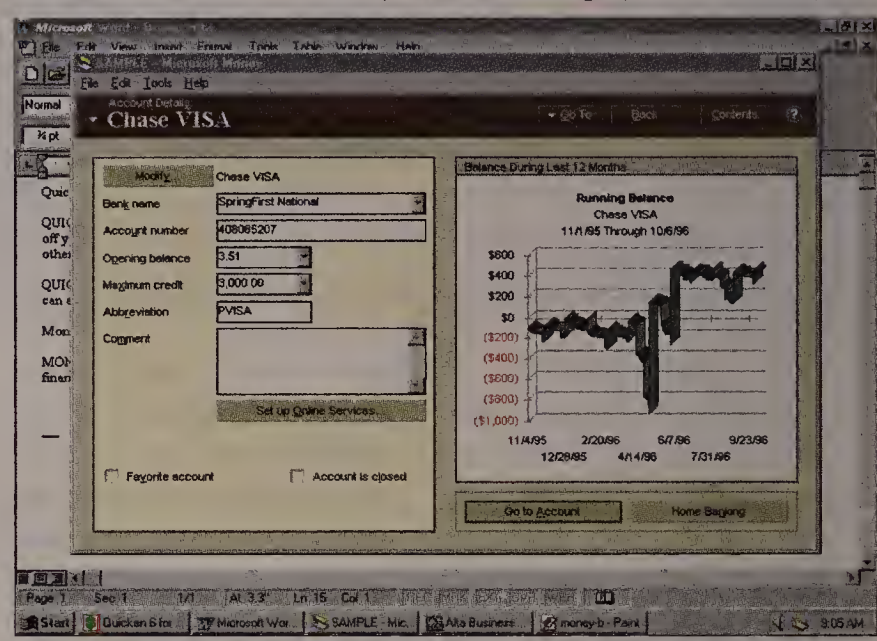
There used to be a clear choice between these two programs based solely on a comparison of features, but the decision now comes down to personal preference. The list of features has grown, and the online service setup is much better, making the new functions easy to use. Quicken and Money now let you access more than one bank account electronically, and they give you choices of bill paying services and methods of connecting to the Internet. Online security is also improved.

Once set up, Quicken gets you productive fast with an opening screen that displays the task you were doing when you last used the program. Tabs down the side of the screen provide easy access to the features you use most. You can jump to all the program's functions from the Activity Bar at the bottom of the screen. Money opens at the Contents screen, which displays large icons that point the way to the program's main functions—Account Register, Planning Wizards, and so on—and also shows a graph of one aspect of your finances.

It's a little easier to get from one part of the program to another in Quicken, thanks to Quick Tabs that take you to frequently used functions. In Money, you must click the Contents button, then pick your next move off the main screen. Or you can add a function to your Favorites list to reach it from the Go To menu that appears on most screens.

I found working with accounts easier in Money, however. For example, you can look at your checking account by clicking the Account Register button and choosing the account from a drop-down list. The register, showing a summary of each transaction, displays on the top two-thirds of the screen, while the details of each transaction appear below. With Quicken, you have to double-click on the transaction itself to display details. Money lets you choose the transaction type (deposit, check, transfer) by clicking on a folder tab, which brings up a data entry screen customized for that type. Money figures out what you're trying to do and fills in blanks or automates routine tasks, saving you time.

Microsoft introduces several features in Money 97 to entice Quicken users. There's a Wizard to help convert files to the Money format, and a tour of the product customized for Quicken habitués. At the same time, Intuit has greatly improved Quicken's screen layout and made all features easier to use. Both pro- ▶



MONEY AT A GLANCE: You can easily see what's going on in each of your accounts using Money's Account Information Screen.

MONEY VERSUS QUICKEN

FEATURES	Microsoft Money 97	Quicken 6 Deluxe for Windows
Operating system	Win 95	Win 3.1, Win 95
Online banking, bill paying, credit card status	●	●
Displays register and transaction simultaneously	●	○
Cash flow forecast	○	●
Links to financial Web sites	●	●
Free stock quotes	●	●
Online demo	www.microsoft.com/moneyzone	www.intuit.com

● Yes ○ No

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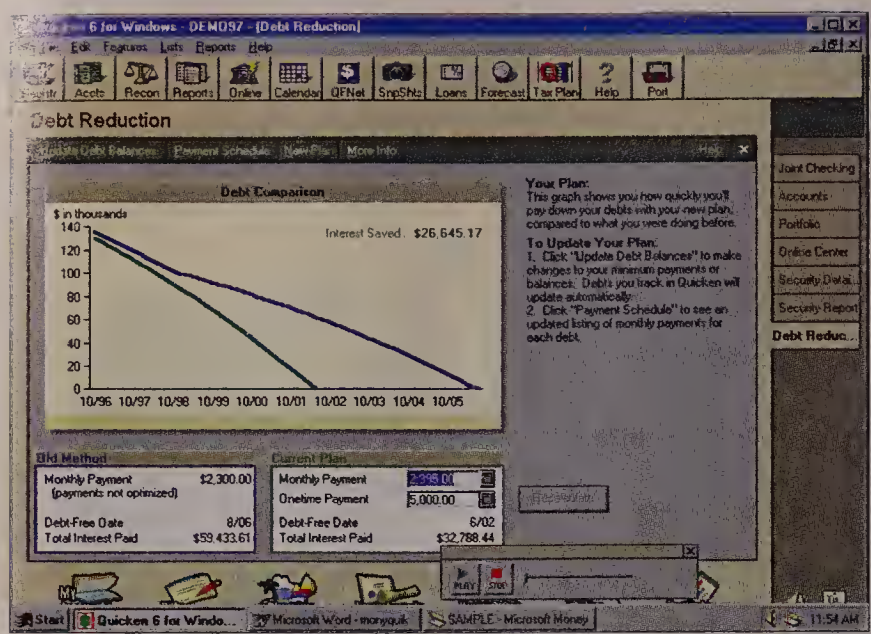


QUICKEN'S SNAPSHOTS display a graphical look at one aspect of your financial situation while giving you access to all the program's functions.

grams greet new users with pop-up tips, and Quicken prompts users with a step-by-step audio guide the first time they try a feature.

If you've gone into debt to buy your PC, you'll be interested in Quicken's debt reduction planner. It grabs data from accounts you've set up for auto loans, mortgages, credit cards, and other liabilities and walks you through the process of paying them off. The planner even includes a link to the Internet to help you find credit cards with lower interest rates. Quicken draws on the data you've entered into your accounts and is an excellent way to manage your finances.

You can compare loans with Money's mortgage planner, though some of its other wizards are a bit simplistic. A button links you to Microsoft's Money Zone Web page, which is best viewed with Microsoft Internet Explorer 3.0. Quicken includes Netscape's Navigator to take you to a page featuring Web sites chosen by the Excite search engine. Report writing is greatly simplified in Quicken and clearly labeled.

Which program should you choose? There's no clear favorite this year—both are great products for getting a handle on your finances. If you're using Money or Quicken now, be sure to upgrade, and check out the competition's Web site to see if you want to switch.

—Theresa W. Carey

Quicken 6 Deluxe for Windows

PRO: Easy to use and learn, packed with help.

CON: Occupies 40MB on your hard disk.

VALUE: Longtime standard remains an excellent choice.

Street price: $60, standard edition $30

Intuit 800/446-8848, 415/944-6000, 415/944-6677 (fax)

http://www.intuit.com

Microsoft Money 97

PRO: Sleek screen layouts, task-based approach.

CON: Online links optimized for Microsoft's browser.

VALUE: For the first time, Money runs nose to nose with the competition.

Street price: $35

Microsoft 800/426-9400

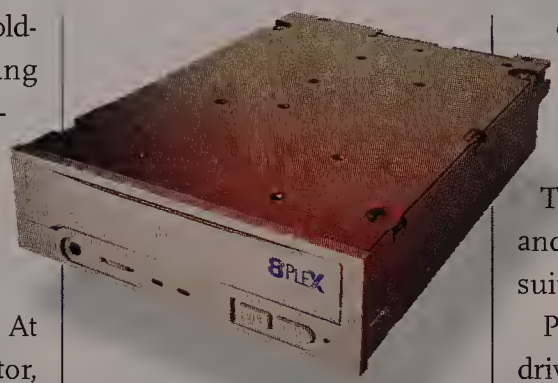
http://www.microsoft.com/moneyzone

READER SERVICE NO. 851

The Fastest CD-ROM Drive in the World

IF YOU'VE been holding off on upgrading your 2X or 4X CD-ROM drive, your patience is about to be rewarded. A flood of high-speed 12X CD-ROM drives is inundating the market. At least three vendors—Plextor, Toshiba, and Mitsumi—have introduced 12X drives, some for less than $200.

Top speed honors go to Plextor, whose preproduction 12Plex PX12CSi SCSI caddy unit was clocked by the PC World Test Center with a record-breaking access time of 101.7 milliseconds. Mitsumi's FX 120, an ATAPI IDE device, logged in at an impressive 120ms. The 12Plex PX-12CSi also achieved a 1.792-megabytes-per-second transfer rate, just under its claimed 1.8MB-per-second rate, for a virtual tie with the Mitsumi.



PLEXTOR'S 12Plex PX-12CSi has record-setting access speed but a high price.

The 12Plex PX12CSi is an internal drive. The fast access time makes it ideal for graphics and applications that require rapid loading of data, such as presentations, training software, and (dare we say it?) games. The drive's fast access time and transfer rate also make it suitable for network use.

Plextor's family of 12Plex drives includes both caddy and caddyless models and internal and external units. Caddy models cost about $50 more than noncaddy models, but the use of a caddy greatly reduces wear and tear on the drive and protects your discs. An internal tray version of the 12Plex PX12CSi costs about $350; an external version is $399.

The Mitsumi costs $249. It comes only in an internal tray version, but it can be mounted either horizontally or vertically. Perhaps the best buys are Toshiba's XM-5071 SCSI and XM-5702 ATAPI units. They were not, however, available in time for testing. Toshiba claims a 125ms access time and a 1.8MB-per-second transfer rate. The internal ATAPI model costs just $165; the SCSI costs $195.

—Russell Glitman

JOHN GREENLEIGH

12Plex PX-12CSi CD-ROM drive

PRO: Fastest drive you can buy.

CON: Twice as expensive as some competitors.

VALUE: A great price for top performance.

List price: internal $350, external $399

Plextor 800/886-3935

http://www.plextor.com

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Put Windows 95 in Your Pocket— Are These the PDAs You've Been Waiting for?

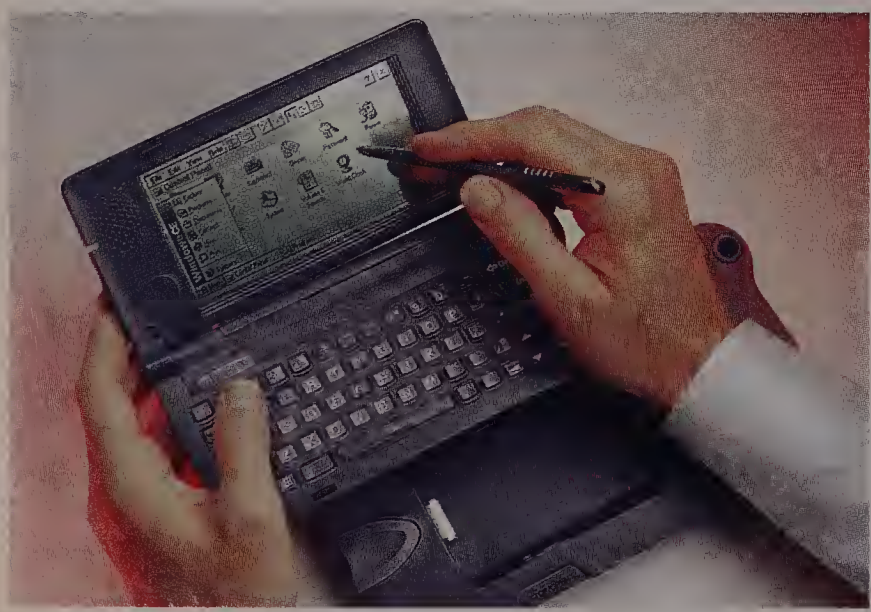
THE PROMISE of handheld PCs can be distilled into one word: *convenience*. To that end, a multitude of vendors have in the past offered a slew of pocket-size PCs—known variously as palmtop computers, personal digital assistants, and electronic organizers. But all of these take-it-on-the-road solutions came with a proprietary interface, a tough learning curve, and poor desktop compatibility and connectivity.

Now another Lilliputian assault is being mounted, and this time Microsoft is in the vanguard. Its compact version of Windows 95, dubbed Windows CE, will be the operating system for a new generation of handhelds that debut in December. Designed as a companion to Windows 95 desktops, Windows CE has the look and feel of Windows 95. It comes with slimmed-down versions of popular Microsoft desktop applications, integrated with the best features of existing palmtop PCs. Unfortunately, the result is a quirky hybrid. Perhaps its greatest drawback is reliance on a stylus for pointing and clicking, which makes typing and navigating awkward—unless you happen to have three hands.

We spent some time with a preproduction version of Casio's Cassiopeia. Its design is the basis for most of the Windows CE handhelds you'll see late this year and early next from vendors like Compaq, Hewlett-Packard, NEC, and Philips.

The Cassiopeia features a touch screen 4.5 inches wide by 2.5 inches tall, with 480 by 240 resolution. It also has an RS-232 serial port connector, a somewhat oversize docking cradle for synchronizing with your PC, a Type II PC Card slot (for modem and memory cards only), WAV sound, a QWERTY keyboard, and an LED light that signals appointments and other scheduled events. A 2MB version is expected to cost between $500 and $550; a 4MB version will cost between $600 and $650. The 7-by-3.5-by-1-inch unit weighs in at 1 pound, including a pair of AA batteries that provide about two weeks of life—as long as you don't use a PC Card modem. Modem use all but demands the optional AC adapter. In fact, when you first insert a modem card, a screen message pops up advising against using battery power.

TINY WINDOWS: Windows CE looks sort of like Windows 95, and the compact version gives you many of the same features.



POCKET PAL? The design of Casio's Cassiopeia is typical of the next generation of PDAs, which use Microsoft's Windows CE operating system.

Casio's touch screen proved hard to read under any lighting conditions. Despite the unit's recessed contrast control and push-button backlighting, we encountered glare at virtually every angle we placed the screen. And if you use your finger instead of the stylus, the resultant smudges make things worse. Surprisingly, we achieved the best screen contrast in a dark room with the backlight. Casio said glare would be significantly reduced in production units.

We found the keyboard hard to use. As with all diminutive keyboards, touch-typing is out; this is strictly hunt-and-peck territory. Because the Cassiopeia's lid includes the screen, the entire unit is top-heavy and rocks when you type.

WINDOWS 95 REDUX

The Windows CE operating system's best feature by far is its comfortable similarity to Windows 95. Pocket versions of Word and Excel come bundled with it. You also get a splendid application that's compatible with Schedule+ and has Calendar and Contacts functions. A Pocket Internet Explorer allows you to browse the Web. However, synchronization with our desktop version of Schedule+ never worked correctly.

While the Cassiopeia includes IrDA infrared connectivity, you need a serial cable for desktop synchronization.

During the development of Windows CE, Microsoft codenamed the operating system Pegasus, after the winged horse. How appropriate. If the preproduction version is any gauge, Windows CE is riding on a wing and a prayer.

—*Michael S. Lasky* ▶

Casio Cassiopeia

PRO: Seamless Win 95 integration.
CON: Poor screen, inconvenient stylus navigation, installation hassles.
VALUE: Promise of portability for Windows documents and schedules.
List price: Starting at $500
Casio Computer
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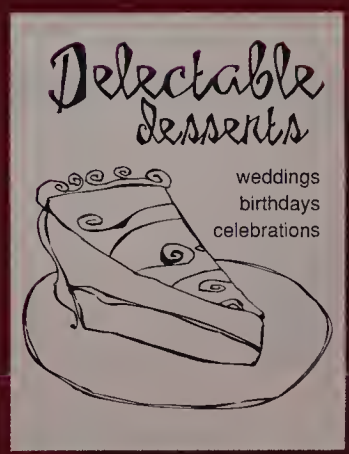

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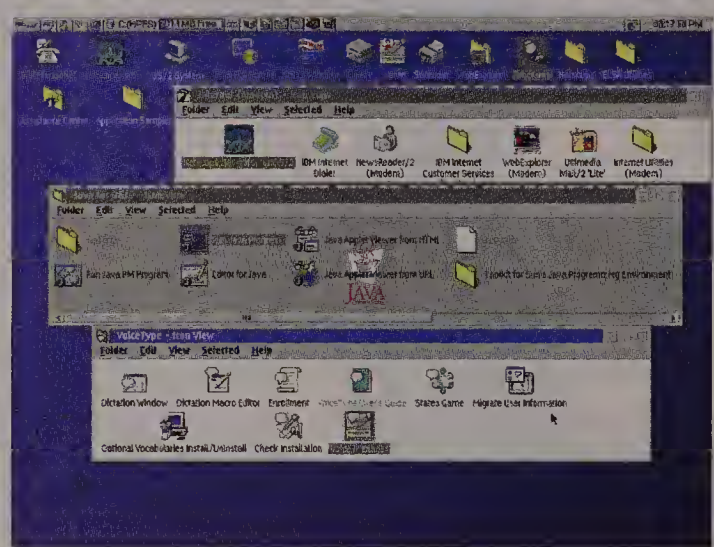
IBM OS/2 Warp 4: Is The Latest Version a Windows Competitor or the Last Gasp?

OS/2 HAS ALWAYS elicited strong emotions: Adherents love it, Windows users fear it, Microsoft haughtily ignores it. The September rollout of the latest version, Warp 4, evoked a new feeling among its followers—a sense of loss—as rumors circulated that the product was on its last legs. Clearly OS/2 is no longer an option for most PC users. Still, Warp 4's new features position it to ride major industry changes brought about by the Internet, and history shows that IBM doesn't abandon products lightly.

Warp 4's greatest strengths are a mixture of old and new. Over the years, OS/2 has evolved into a surefooted, multitasking operating system. Warp 4 builds on this with a *universal client,* which connects to virtually all PC networks; built-in Internet connectivity; the ability to run Java applets without a browser; and IBM's VoiceType voice recognition software for navigation and dictation.

As with prior versions, Warp 4's greatest weakness remains a dearth of applications. You still can't run 32-bit Windows 95 or NT applications under OS/2, and that situation won't change. Meanwhile, native OS/2 apps remain few and far between. IBM's Open32, a developer-level specification that is supposed to make it easy for software companies to write apps for both Windows and OS/2, has been ignored by the industry. The one bright spot: Lotus, which is owned by IBM, was beta testing a new version of its OS/2 SmartSuite at press time.



GETTING WARPED: The latest OS/2 includes advanced connectivity, Java compatibility, and voice recognition.

COFFEE FUTURES

Plainly, Microsoft dominates the desktop. And OS/2's installed base is not likely to grow. Furthermore, corporate America is considering Windows NT 4.0 for projects that previously went to OS/2. According to Bob Sakakeeny, an analyst with The Aberdeen Group, IBM is trying to maintain satisfaction among current OS/2 users—primarily in corporate IBM shops.

Optimism for the future of OS/2 stems from Warp 4's ability to run Java applets—it's the first operating system to include that feature. If Java-based applications catch on, OS/2 will be well positioned. "Java is the future for writing serious applications," says Paul Giangarra, IBM senior OS/2 engineer.

OS/2 has never been a product for the masses. IBM is finally accepting that state of affairs and is building on the operating system's strengths. If you love OS/2, Warp 4 is a solid upgrade. If you can't stand it, you're safe for now.

IBM, 800/426-2255

—*Stan Miastkowski* ■

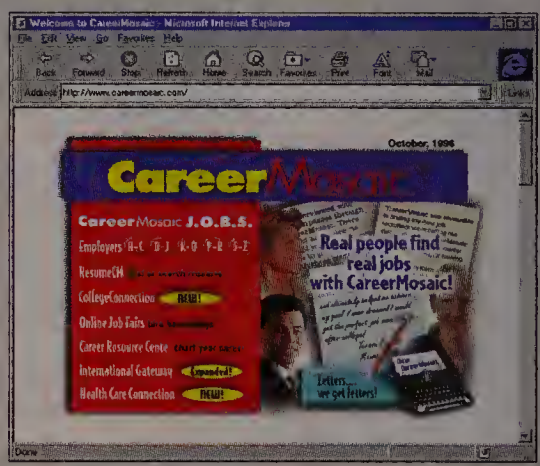
WEB BROWSER

How to Find a Job on the Net

FINDING THE RIGHT JOB is a job in itself. Fortunately, a score of new services on the Web can make quick work of your search for employment.

Almost all the job hunting sites offer searchable employment databases, but individual job announcements don't show up everywhere, so visit a variety of sites.

One of the oldest online job services, **Career Mosaic** (http://www.careermosaic.com/), has links to job fairs and lets you browse for job opportunities by employers' names. IntelliMatch has a sophisticated system in place to act as broker between job seekers and employers. You can reach the site via the PC World Annex at http://www.pcworld.com/annex (*PC World* receives revenue from **IntelliMatch** for this service). **Career-Path.com,** with a clean, simple design, has links to classified ads in dozens of newspapers, including the *Los Angeles Times,* the *Boston Globe,* and the *New York Times.* Check out its job leads at http://www.careerpath.com/. If you don't mind a learning curve, **E-Span** (http://www.espan.com/) has volumes of human resource and job search reference materials. At the other end of the spectrum is the **Online Career Center** (http://www.occ.com/) with links to employment agencies and a simple front-end to a job-listing database. —*Richard Overton*



DREAM JOB? Job search services such as Career Mosaic put a new spin on networking.

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The Reasoning Behind the Strength of Some Letters as it Relates to the Strength of Others

by Dan Krewson
SOC 101
Prof. Schoen
June 29, 1996

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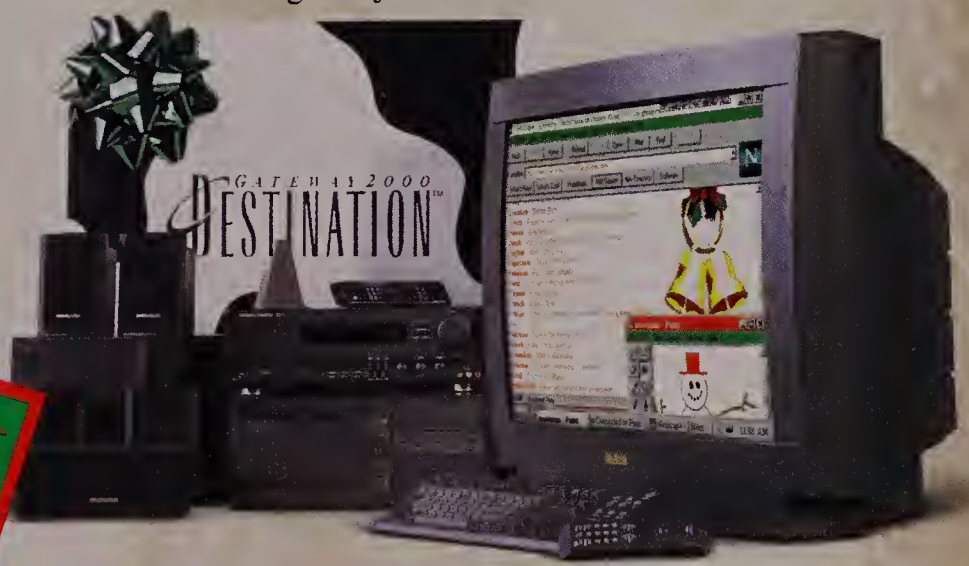
We've Gotten Bigger This Year!

Like Santa, we're burstin' at the seams ... with pride. The Destination™ Big Screen PC is the star on the GATEWAY™ product tree! And now it's more affordable than ever, with prices starting as low as $2,999.

Gather the whole gang. Powerful PC technology, digital television capabilities and everything you need to sled the Web are yours to enjoy for the holidays and the new year! Best of all, you can experience everything from the comfort of your couch. Your living room will become a hub for education, communication and entertainment. Call us today for more details on the Destination system and a free* digital satellite system offer from DISH™ Network. It's such a great deal, this holiday season you won't even have to tighten your belt!



For a limited time, Destination system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to qualifying programming package from DISH Network for $300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network.

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PENTIUM PRO PROCESSOR

GATEWAY2000
"You've got a friend in the business."®

800-270-5734
http://www.gw2k.com

Top-Of-The-Line Technology!

Hats off to Santa for delivering the latest and greatest technology and outstanding values from Gateway 2000.

If you're looking for PC performance that will blow you away, you need Intel's next-generation Pentium® Pro processor — the smart choice for today's *and* tomorrow's 32-bit software. Microsoft® Office 95, Professional Edition* applications will fly like Santa at sunrise when powered by a Pentium Pro processor.

Need a Pentium processor-based PC? Look no further. Our professional Pentium processor-based systems are packed with features and they're priced right. Tell us your needs. We'll build a PC to your specifications and pre-install the software. You've been good this year, so treat yourself. Call Gateway today!

*For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft.

intel inside
PENTIUM PRO PROCESSOR

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All The Bells And Whistles!

It's all here! Gateway is your one-stop shop for fully-loaded Family PC™ systems, XL multimedia computers and quality software.

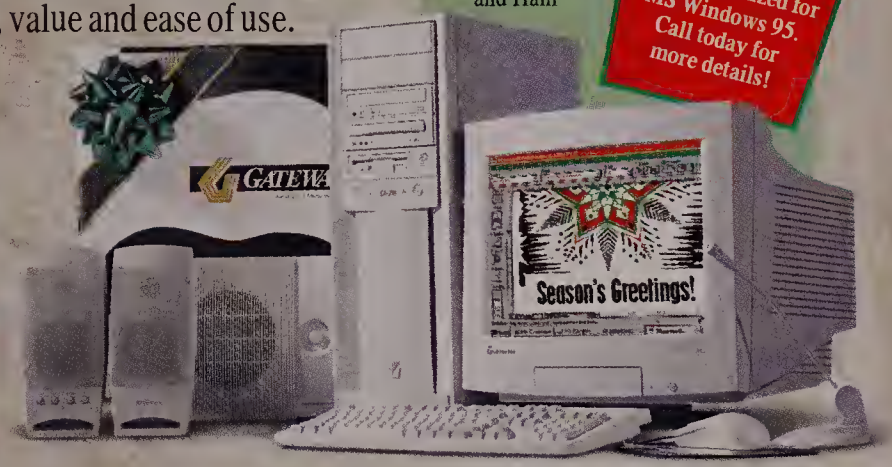
The performance of an Intel Pentium® Pro processor, MS® Windows® 95 and Generations III has moved home for the holidays — and for years to come! Because we custom build each PC, you get a system that meets your needs *and* fits your budget. You choose from cool technology like Gateway exclusive Altec™ Lansing speakers, fast CD-ROM drives, CD-recordable drives, and hardware accelerated 3-D video for smooth gaming and animation graphics. Bright, vivid images shine through on our CrystalScan®700 monitors with advanced Microfilter™ picture tube technology.

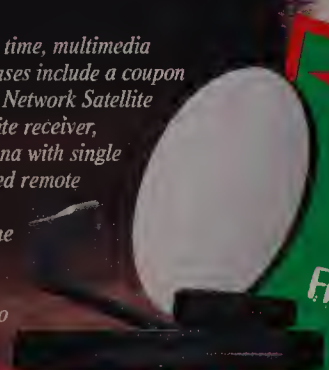
It's a present the whole family will love! Plus, you can take advantage of a free* digital satellite system offer from DISH™ Network. Ring in the new year with unprecedented 32-bit performance and value. Add up software savings too. We offer additional specialized software bundles for every stocking! The Gateway Select program makes it easy by setting software standards for quality, value and ease of use.

Generations III

- Microsoft® Encarta®
- MS Works
- MS Publisher
- Monopoly™
- Green Eggs and Ham

And much more! Many optimized for MS Windows 95. Call today for more details!





HOLIDAY BONUS! Free* DISH Network Digital Satellite System Offer. Call for details!

For a limited time, multimedia system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to a qualifying programming package from DISH Network for $300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network.

intel inside PENTIUM® PRO PROCESSOR

GATEWAY 2000

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800-270-5734

http://www.gw2k.com

Holiday Goodies To Go!

Whether you're off on a delivery or headed home for the night, Gateway Solo™ 2100 multimedia portables really haul! Hand-pick the portable options you need. A powerful Intel Pentium® processor and Microsoft® Windows® 95 will get you off to a great start. Then choose the size of your screen, hard drive, memory, processor speed and either MS Office 95 Professional Edition* or MS Works 95. Continue customizing your computer with the flexibility of modular components. It's easy to swap a CD-ROM drive for a floppy drive, and since they aren't built in you have less weight to carry around. Plus, a removable hard drive makes it a snap to secure data. Steer clear of companies that leave you without options. Wherever you need to be, Gateway Solo 2100 portables deliver power-packed performance at a great value!

*For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft.

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We're Delivering Magic This Year!
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PROCESSOR

Gateway makes holiday shopping *seem* like magic.
Along with high-performance, quality PCs, we bring you good tidings of two new financing options, available exclusively to Gateway customers — past and present.
Gateway
Easy Pay Plan
• No payments for 90 days
• Fixed monthly payments
• Borrow $1,000 to $25,000
• Quick credit approval
Gateway 2000
Moola MasterCard® Credit Card
• 1% of net retail purchases accumulate as points in a Moola account toward future Gateway purchases *(certain restrictions apply)*
• Competitive interest rate
• No annual fee
Gateway accepts most major credit cards and C.O.D. terms. Qualified commercial customers can choose from net 30-day credit terms or leasing options as well. We'll go out of our way to light up your holidays. In fact, if you aren't totally satisfied, you can return your PC within 30 days of the original delivery date for a refund of the purchase price (shipping charges to and from the customer are not refundable). Plus, we have a great limited warranty — just call or write for details. Gateway knows how to deliver satisfaction. In the October *FamilyPC* magazine, 94% of the Gateway customers surveyed said they'd recommend their Gateway system to a friend. Give us a jingle. We'll make *your* holidays merry!
The Gateway Easy Pay Plan and Moola MasterCard credit card are issued and administered by MBNA America Bank, N.A.
GATEWAY2000
"You've got a friend in the business."®
800-270-5734
http://www.gw2k.com

Holiday Upgrades!

Wrap up your holidays here! The finishing touches you need to complete and compliment your computer are available with the purchase of any GATEWAY™ PC. We'll pre-install these upgrades for you and deliver your system right to your doorstep — just like Santa.

Altec Lansing ACS-410 speaker system and ACS-250 subwoofer

Desktop Upgrades

- **Altec™ Lansing ACS-250 Subwoofer $75**
- **Altec Lansing ACS-410 Speaker System w/ ACS-250 Subwoofer $120**
  (upgrade from PCs that include Altec ACS-41 speakers)
- **12X CD-ROM Drive** — Call for details!
- **CD-Recordable Drive $499**
  4X read/2X write recordable CD drive with SCSI controller, CD Creator 2 for MS® Windows® and three media disks.
- **Iomega® Ditto™ 3200 Internal Tape Backup Unit $199**
  3200MB with compression, nominal 1600MB
- **Iomega External Zip™ 100MB Drive $199**
  (less $50 manufacturer rebate)
- **Iomega Jaz™ 1GB Drive $429**
  (includes SCSI controller and 1GB cartridge)
- **MS® Windows NT® 4.0 Upgrade $99**
  (upgrade from PCs that include MS Windows 95)

Gateway Solo 2100 docking bar

Portable PC Upgrades

- Gateway Solo™ 2100 Docking Bar **$199**
- 28.8 PCMCIA Fax/Modem **$200**
- Upgrade 120MHz to 133MHz Intel® Pentium® Processor **$150**
- Upgrade 133MHz to 150MHz Intel Pentium Processor **$150**
- Upgrade from an 11.3" Dual Scan to an 11.3" Active Matrix SVGA color display **$380**
- Upgrade from an 11.3" Active Matrix to a 12.1" Active Matrix SVGA color display **$150**

harman/kardon high-fidelity sound system

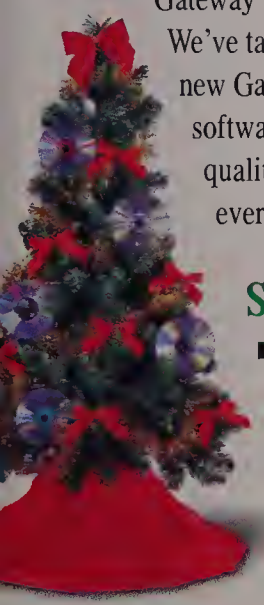
Destination™ Big Screen PC Upgrades

- **harman/kardon High-Fidelity Sound System**
  Seven-piece Dolby® Pro Logic® Surround Sound speaker system including AVR-10 audio/video receiver with remote, subwoofer, center channel, and four satellites for the ultimate multimedia audio experience. **$699**

Stocking Stuffers!

Visions of peripherals dancing in your head? You've ome to the right spot! But remember, these offers are vailable only for Gateway PC owners — both old and new. f you'd like to see our complete line of stocking stuffers, call omponent add-on sales at 800-846-2080. Sales Hours: am-10pm weekdays (CT).

GATEWAY SELECT



Gateway software bundles will make your holidays merry. We've taken the work out of shopping for software. Our new Gateway Select program ensures that you're getting software that meets or exceeds our standards for quality, value and ease of use. There's something for everyone! At these prices, why not buy two?

Software

- **Games & Entertainment Pack**
  Includes Su-27 FLANKER™; Al Unser Jr. Arcade Racing™; 3-D Ultra Pinball™; The Journeyman Project 2®: Buried in Time™; Greg Norman Ultimate Challenge® Golf; Windows 95 Game Sampler and game pad. **$99**
- **Kid's BackPack™ III**

ncludes Schoolhouse Rock!™: Grammar Rock™; Sesame Street: Get Set o Learn®; Math Blaster® Episode 2: Secret of the Lost City; Imo & The ing™; Putt-Putt® Goes To The Moon™; and Gateway cow-spotted ackpack. **$59**

- **Finance Pack** *(U.S. Shipment Only)*
  ncludes Quicken® Deluxe 5, Quicken Financial Planner,™ Quicken amily Lawyer,™ and Quicken Parents' Guide to Money.™ **$69**

Great Extras

- MS SideWinder™ 3D Pro Joystick **$59**
- SKYMASTER Joystick **$39**
- Snappy™ Video Snapshot **$199**
- Epson PhotoPC™ Color Digital Camera **$399**
- Microsoft Natural Keyboard™ **$59**

Printers and Scanners

Put the finishing touch on your computing package with one of these quality printers. Ask your sales representative which one is right for you. All printers include cables and ink cartridges.

- Epson® Stylus™ Color 200 Ink Jet Printer **$179**
- Epson Stylus Color 500 Ink Jet Printer **$279**
- Hewlett®-Packard 682C Ink Jet Printer **$299**
- Epson Stylus Pro Ink Jet Printer **$379**
- Hewlett-Packard LaserJet 5L Xtra Laser Printer **$479**
  (less $50 manufacturer rebate)

Service & Support

Gateway Gold™ Premium for Desktop Systems

- Extended Three-Year On-Site Agreement*
- Priority 800 Number For Access to Technical Experts
  With system purchase **$99**
  Within term of current on-site service agreement **$129**

**On-site service is available to most locations in the continental United States, Alaska, Hawaii, Puerto Rico and Canada after you and your Gateway technician determine an on-site visit is necessary. On-site service is provided by PC Technology Services, Inc. On-site is not available for any monitor, mouse, keyboard, or portable system. Write or call for a free copy of the on-site service agreement.*

Antiques furnished by Kristi's Antiques, Lyons, NE.

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PENTIUM PRO PROCESSOR

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http://www.gw2k.com

P5-133 FAMILY PC

- Intel® 133MHz Pentium® Processor
- 16MB Synchronous DRAM
- CrystalScan®500 .28dp Monitor (14" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 1.2GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit GATEWAY™ Sound
- Altec™ Lansing ACS-41 Speakers
- TelePath® 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS® Mouse 2.0
- Microsoft® Windows® 95
- Generations III Software Collection
- Gateway Gold™ Service & Support for Desktop PCs
- DISH™ Network Satellite System Offer**

$1699 As low as✗ $48/mo.

P5-166 FAMILY PC

- Intel 166MHz Pentium Processor
- 16MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Gateway Sound
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2199 As low as✗ $62/mo.

P5-200 FAMILY PC

- Intel 200MHz Pentium Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq® Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem *for Windows* with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2499 As low as✗ $70/mo.

G6-180 FAMILY PC

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2499 As low as✗ $70/mo.

G6-200 FAMILY PC

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- STB® ViRGE™/VX 4MB, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- Altec Lansing ACS-41 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations III Software Collection
- Gateway Gold Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$2999 As low as✗ $84/mo.

G6-200XL

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- STB ViRGE/VX 8MB, 3-D 64-Bit PCI Graphic
- 3.8GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- CD-Recordable w/ SCSI Controller
- 16-Bit Ensoniq Wavetable Sound Card
- Altec ACS-410 & ACS-250 Speakers
- TelePath 33.6 Data*/14.4 Fax Modem with Speakerphone
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Generations III Software Collection
- Gateway Gold Premium Service & Support for Desktop PCs
- DISH Network Satellite System Offer**

$3799 As low as✗ $106/mo.

Professional Systems

P5-133

Intel 133MHz Pentium Processor
16MB Synchronous DRAM
256K Pipelined Burst Cache
CrystalScan500 .28dp Monitor
(13.9" viewable area)
2MB DRAM, 64-Bit PCI Graphics
1.2GB 11ms EIDE Hard Drive
8X CD-ROM/3.5" Diskette Drives
7-Bay Mini Tower Case
104+ Keyboard & MS Mouse 2.0
MS Windows 95
MS Office 95, Professional Edition
MS Office 97, Professional Edition Upgrade Coupon◆
Gateway Gold Service & Support for Desktop PCs

$1649 Business Lease† $61/mo.

P5-166

- Intel 166MHz Pentium Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- CrystalScan700 .28dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$2299 Business Lease† $85/mo.

G6-180

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron™700 .26dp Monitor (15.9" viewable area)
- 2MB SGRAM, 3-D 64-Bit PCI Graphics
- 3.8GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition
- MS Office 97, Professional Edition Upgrade Coupon◆
- Gateway Gold Service & Support for Desktop PCs

$2499 Business Lease† $92/mo.

G6-200

Intel 200MHz Pentium Pro Processor
32MB EDO DRAM
256K Internal Cache
Vivitron700 .26dp Monitor
(15.9" viewable area)
STB ViRGE/VX 4MB, 3-D 64-Bit PCI Graphics
3.8GB 11ms EIDE Hard Drive
8X CD-ROM/3.5" Diskette Drives
12-Bay Tower Case
104+ Keyboard & MS Mouse 2.0
MS Windows 95
MS Office 95, Professional Edition
MS Office 97, Professional Edition Upgrade Coupon◆
Gateway Gold Service & Support for Desktop PCs

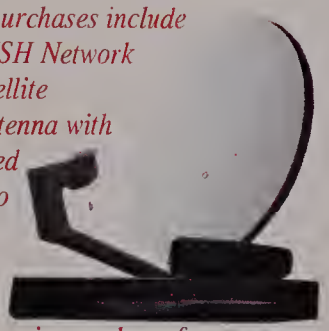
$2699 Business Lease† $99/mo.

**Maximum data transfer rate dependent on certain variables including particular modems with which you are communicating, telephone lines, communications software and communications protocols.*

◆For a limited time (with qualifying purchase) receive a coupon for a free MS Office 97, Professional Edition upgrade on CD after release from Microsoft. Call for details!

Gateway 2000 Quality Management Systems for Customer Hardware Support, Sioux Falls, South Dakota; Desktop & Portable Manufacturing Divisions and Remanufacturing in North Sioux City, South Dakota, are ISO 9002 certified.

***For a limited time, Destination and Gateway multimedia system purchases include a coupon for one DISH Network Satellite system (satellite receiver, 18-inch antenna with single LNBF, infrared remote control) at no charge with the purchase of a one-year subscription to a qualifying programming package from DISH Network for $300. Taxes, delivery and installation not included. Satellite system service covers 48 contiguous states and is supported by DISH Network.*



GSA Schedule #GS-35F-3349D

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Toll free from Puerto Rico 800-846-3613

610 Gateway Drive • P.O. Box 2000 • N. Sioux City, SD 57049-2000 • Phone 605-232-2000 • TDD 800-846-1778 • Fax 605-232-2023 • FaxBack 800-846-4526 • International FaxBack Access 605-232-2561
Component Add-On Sales 800-846-2080 • Sales Hours: 7am-10pm Weekdays, 9am-5pm Saturdays & Sundays (CT)

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Destination™ Big Screen PCs

D5-133

- Intel® 133MHz Pentium® Processor
- 32MB Synchronous DRAM
- 256K Pipelined Burst Cache
- Destination 31" VGA Monitor
- STB® 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq® Wavetable Sound Card
- TelePath® 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad™ Pointing Device
- Wireless Field Mouse® Remote
- Four-Channel RF Receiver
- Microsoft® Windows® 95
- Destination Software Collection
- Gateway Gold™ Service and Support✚ for Big Screen PCs
- DISH™ Network Satellite System Offer**

$2999 As low as✗ $84/mo.

D6-180

- Intel 180MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 2.5GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- ▸ **harman/kardon High-Fidelity Sound System**
- TelePath 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad Pointing Device
- Wireless Field Mouse Remote
- Four-Channel RF Receiver
- MS® Windows 95
- Destination Software Collection
- Gateway Gold Service and Support✚ for Big Screen PCs
- DISH Network Satellite System Offer**

$3999 As low as✗ $112/mo.

D6-200

- Intel 200MHz Pentium Pro Processor
- 64MB EDO DRAM
- 256K Internal Cache
- Destination 31" VGA Monitor
- STB 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
- 3.8GB 11ms EIDE Hard Drive
- 8X CD-ROM/3.5" Diskette Drives
- 16-Bit Ensoniq Wavetable Sound Card
- ▸ **harman/kardon High-Fidelity Sound Syste**
- TelePath 33.6 Data*/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
- Wireless Keyboard w/ Integrated EZ Pad Pointing Device
- Wireless Field Mouse Remote
- Four-Channel RF Receiver
- MS Windows 95
- Destination Software Collection
- Gateway Gold Premium Service and Support✚ for Big Screen PCs
- DISH Network Satellite System Offer**

$4799 As low as✗ $134/mo.

Gateway Solo™ 2100 Portable PCs

S5-120

- 11.3" DSTN SVGA Color Display
- Intel 120MHz Pentium Processor
- 16MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 810MB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- NiMH Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Works 95
- Gateway Gold Service and Support for Portable PCs

$2499 As low as✗ $70/mo.

S5-133

- 11.3" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 24MB EDO DRAM expandable to 40MB
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 1.3GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition◆
- Gateway Gold Service and Support for Portable PCs

$3549 As low as✗ $99/mo.

S5-133 Best Buy

- 12.1" Active Matrix SVGA Color Display
- Intel 133MHz Pentium Processor
- 40MB EDO DRAM
- 256K Pipelined Burst Cache
- 1MB EDO Video RAM
- Zoomed Video Port
- 1.3GB Hard Drive
- Modular 6X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Sound & Stereo Speakers
- 28.8 PCMCIA Fax/Modem
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
- Carrying Case
- MS Windows 95
- MS Office 95, Professional Edition◆
- Gateway Gold Service and Support for Portable PCs

$4149 As low as✗ $116/mo.

***DISH Network Satellite system offer and ◆MS Office 97, Professional Edition upgrade coupon details on previous page.*
✚The Destination 31" monitor is covered by a one-year limited warranty.

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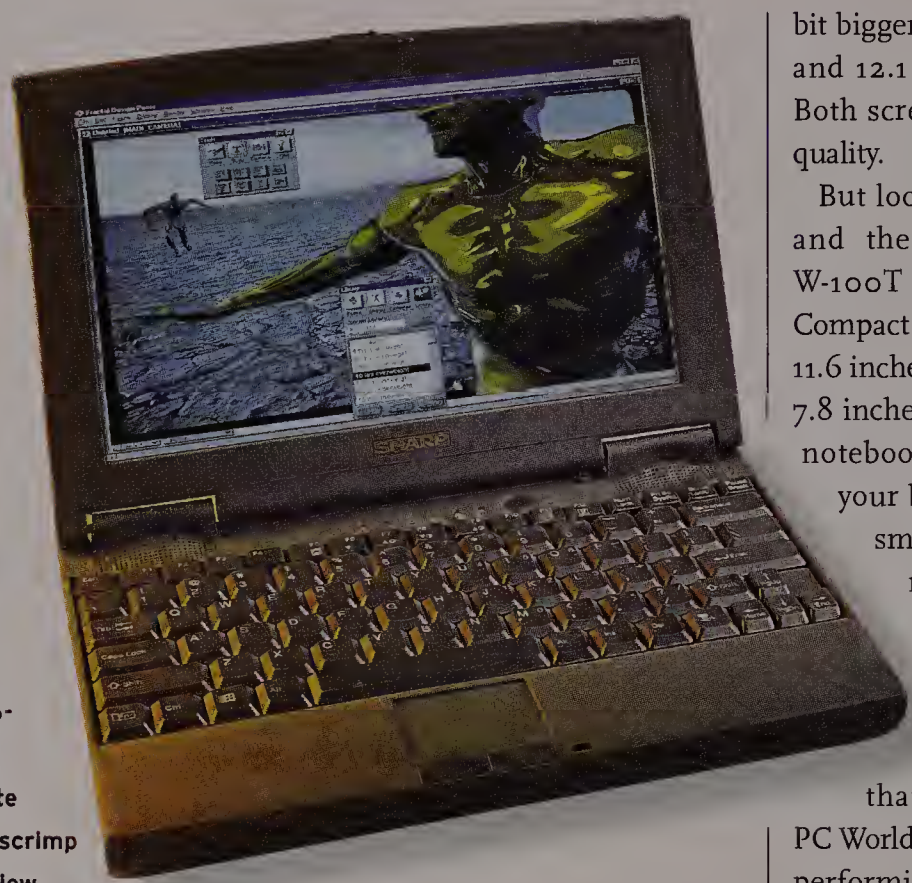
NEW PRODUCTS

Sharp WideNote W-100T Puts On Quite a Display



THE 4.6-POUND WideNote doesn't scrimp on the view.

NOTEBOOK

THIN AND WIDE sounds more like pasta than personal computers, but you can't argue with the results. This year's "thin and wide" notebooks are a feast for your eyes and a cinch to carry. They have huge screens that give your vision a break, make your presentations look terrific, and let you examine an entire spreadsheet without scrolling for miles. Sharp's $3499 **WideNote W-100T**, the newest entry in the category, offers a particularly good value. Its active-matrix SVGA display measures 9.5 inches wide, 5.5 inches high, and 11.2 inches diagonally. This Pentium-133 notebook runs at a brisk pace, carries a competitive price tag, and weighs a mere 4.6 pounds.

Not that Sharp has left all its competition in the shade. IBM, one of the first vendors this year to introduce a thin and wide notebook, can boast that its ThinkPad 560 is a 4.1-pound wonder that's only 1.2 inches thick. Compared to the Sharp's WideNote, IBM's $2699 ThinkPad's active-matrix screen measures just a bit bigger, at 9.8 inches wide and 12.1 inches diagonally. Both screens offer excellent quality.

But look past the surface, and the Sharp WideNote W-100T has other charms. Compact (at 1.6 inches thick, 11.6 inches wide and standing 7.8 inches high upright), the notebook also fits easily in your briefcase. That's no small benefit when you need to get on a plane with just two carry-on bags.

We tested a preproduction model that sped through the PC WorldBench test suite, outperforming the average Pentium-133 notebook and coming close to the scores of Pentium-150 units. (The ThinkPad 560 incorporates a less-powerful Pentium-100 processor.) If you do much transferring of files between a desktop PC and notebook, or between two notebook PCs, the WideNote W-100T's 4-megabytes-per-second infrared port will save you time. Unfortunately, only a handful of machines support this new, faster IR data transfer standard.

The WideNote also comes with 16MB of RAM, a 1.1GB hard drive (not removable, unfortunately), S3's 86CM65 graphics chip (a new type of video graphics chip designed for notebooks), a generous keyboard, and a 28.8-kbps voice/data modem. The unit holds two Type II or one Type III PC Cards. To get the 100T's compactness and low weight, you must make a couple of sacrifices, including making do with an external floppy drive, which is already included in the WideNote's price. Sharp says the lithium ion battery lasts 2 to 4 hours; our tests pegged it at just under 2.5 hours, adequate for most users, but it won't get you cross country.

For people on a tighter budget, Sharp's $2999 **WideNote W-100D** provides the same features, weight, and carrying case; its display is dual-scan, however.

Both Sharp units offer plenty of computing power and screen real estate, in a thin and lightweight package. It's a great recipe for a notebook.

—Laurianne McLaughlin

Sharp WideNote W-100T, W-100D

PRO: Excellent performance, huge screen, compact case, nice price.

CON: External floppy drive, average battery life.

VALUE: A real deal.

List price: 100T $3499, 100D $2999

Sharp Electronics

800/237-4277

http://www.sharp-usa.com

READER SERVICE NO. 744

Astound's Artful Windows 95 Features

PRESENTATIONS

IF YOU'RE LIKE most people, you don't choose a presentation package; rather, you use whatever comes with your application suite. Usually, that's okay, because suite-based products such as Microsoft Office's PowerPoint and Lotus SmartSuite's Freelance Graphics are well-tuned to the needs of novices and occasional users.

But for those who want to dress up their presentations with truly sophisticated multimedia, Astound's package has long been a better choice than any suite-based program. Even though the suites have beefed up their multimedia support, **Astound 4.0**, the first version for Windows 95, has sprinted further ahead.

As before, Astound has a timeline editing mode that lets you precisely synchronize all the elements in a show, which isn't possible in PowerPoint or Freelance. It also retains its superior animation tools. It's easy, for instance, to create a 3-D animated pie chart that tumbles onto the screen one wedge at a time. You can also create on-screen buttons that perform a dizzying range of tasks; these interactivity tools are potent enough to render it a low-cost alternative to multimedia authoring systems like Macromedia Director.

Many features of older versions have been refined in Astound 4.0. Its animation features are easier to use—you can now add animation to any on-screen object by simply clicking on it and dragging it over the path you want it to follow. Buttons created in a presentation can now sport ToolTip-style identifiers—small text labels that appear when the mouse pointer hovers over the button for a few moments.

ASTOUND'S RICH MULTIMEDIA FEATURES beat those of better-known presentation packages but take time to master.

Like seemingly every other software upgrade, Astound has turned its attentions to the Web. In my tests of a prerelease version, it converted shows to HTML with respectable fidelity, but didn't attempt to retain any multimedia elements. If you want your Web-based presentations to keep more of their original content—including animation and MIDI music—you can post them on the Web in Astound's proprietary format. The catch is that other users can get this content only if they've equipped their Web browser with a special Astound viewer applet.

If Astound 4.0 has a major liability, it's that you really have to spend some time learning how to harness its power. Beginners who just want to build very simple presentations may be intimidated by its profusion of options. And even though the program has adopted an up-to-date Windows 95 look, with effective use of tabbed dialog boxes and context-sensitive menus, there are a few odd lapses in usability. For instance, when I needed to change a text block's font and size, I naturally turned to the QuickSet, a new feature that mimics Freelance Graphics' InfoBox all-in-one formatting palettes. But basic text formatting tools are just about the only thing you *won't* find in the QuickSet.

Unaccountably, this upgrade has done away with Astound Studio, a set of powerful bundled applications for creating animations, sound clips, and other multimedia elements from scratch. The Studio tools are now a $49 option but are free to those who upgrade.

Astound isn't the only veteran presentation package that's back in a Web-savvy edition. Adobe's Persuasion 4.0 has its own take on the Web. We'll look at Persuasion in depth next month.

—*Harry McCracken* ▶

Astound 4.0 for Windows 95/NT

PRO: Powerful interactivity.

CON: Features are tricky to master.

VALUE: The best presentation package for multimedia mavens.

Astound Inc.
415/845-6200
http://www.astoundinc.com
Street price: $249; competitive upgrade $99

READER SERVICE NO. 745

EDITED BY
Laurianne McLaughlin and Gabrielle Mitchell

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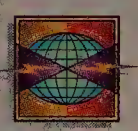
INTERNET



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Adobe Adopts Homogeneous Look for Apps

GRAPHICS

FOR MANIPULATING pictures or designing pages, Adobe Photoshop and PageMaker are big names in high-end graphics. Unfortunately, both take time and patience to learn. Adobe's latest releases of Photoshop and PageMaker attempt to shorten that learning curve.

USING PHOTOSHOP 4.0's new Adjust Layers palette you can change color balance or hue, for instance, without altering the image below.

Adobe has adopted similar interfaces for **Photoshop 4.0** and **PageMaker 6.5**, so using one should make the other just as accessible. Launch the new apps side by side, and you'll be hard-pressed to tell the difference between the two. Although users already familiar with PageMaker may need to learn a few new tricks, Photoshop works the same as it did before.

LAYERED LOOK

Of the two, PageMaker demonstrates the most visible enhancements over the prior version. For starters, PageMaker 6.5 borrows the layers metaphor introduced last year by Photoshop. Layers allow you to experiment with various layout ideas inside one file rather than several. For example, using PageMaker layers you can now design a page in two languages—one layer in French, the other in English—within the same file. When it comes time to publish, simply hide the language layer you don't need.

To help you keep your page designs consistent, PageMaker 6.5 now gives you the option of creating page templates with frame boxes, so all you have to do is pour in text and graphics. If you change your mind later and you need to resize a page, say from letter to tabloid, PageMaker automatically adjusts page elements such as column widths, graphics, and objects. You can also drag and drop hyperlinks from Web browsers directly into PageMaker, assign new links, and test new ones using a Hyperlink palette.

OLD DOG, NEW TRICKS

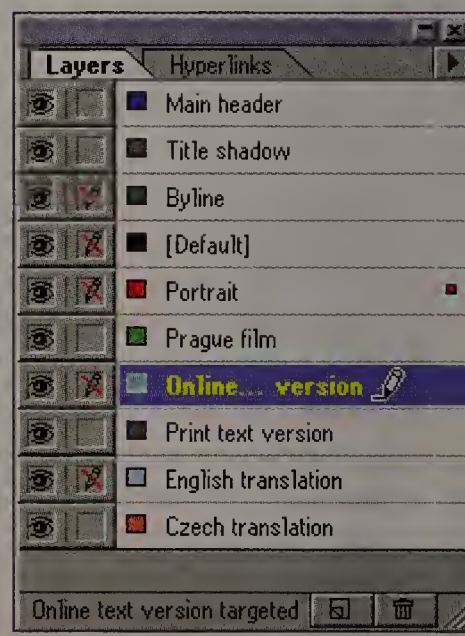
Photoshop's enhancements are less obvious than PageMaker's, but they make version 4.0 far more forgiving. Photoshop has never supported multiple undos and still doesn't, but the new Adjust Layers mode is an intelligent workaround. Rather than alter your original image, you apply effects—such as a change in color balance—to layers, then apply the layers to your image. This way you can selectively undo unwanted effects by turning off the layer.

Photoshop still takes time to churn through effects and requires oodles of disk space (at least three times the size of the image you're manipulating). People familiar with Photoshop may be disappointed that it still doesn't support resolution-independent editing of large images in real time. But Photoshop 4.0 flies on a multiprocessor PC running Windows NT. To speed up repetitive day-to-day chores, simply record and play back the imaging tasks you perform regularly, and Photoshop does the tasks for you. The new Navigator thumbnail palette helps you zoom closer and away from an image quickly without getting lost. On the thumbnail, just point to the area you want to see, and the big picture takes you there. Also noteworthy: snap-to guides and grids—borrowed from PageMaker and Illustrator—and a Free Transform tool that lets you scale, skew, rotate, distort, or change perspective of any image from a single dialog box. Photoshop also incorporates all 48 of the Adobe Gallery Effects filters into its suite of special effects.

Worried about image theft? Adobe breaks new ground by allowing you to mark important images with an invisible digital watermark and register it over the Internet. Anyone who opens an image that contains such a mark will be informed that the image is copyrighted. The watermark is invisible, but according to Adobe, Photoshop can still detect it even after the image has been printed and scanned.

The forthcoming upgrade to Adobe Illustrator should look just as familiar. According to Adobe strategists, Illustrator will adopt the same attachable tabbed palettes metaphor, the layers metaphor, and a similar toolbar and menu.

—John Goddard ▶



ADOBE'S INTERFACE lets you layer graphics and add hyperlinks to the Web.

Adobe Photoshop 4.0, Adobe PageMaker 6.5

PRO: Similar interfaces, greater Web access.

CON: Expensive, requires ample system resources.

VALUE: Upgrade best for pros.

Adobe Systems Inc.

800/833-6687

http://www.adobe.com

List price: $895 each

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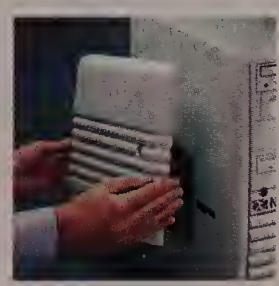

Removing the left-hand quick access panel provides easy access to expansion slots.

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intel inside pentium PROCESSOR

Microsoft FrontPage 97 Improves HTML Editor

WEB AUTHORING

THANKS TO RAPIDLY escalating competition among Internet software makers, HTML editors have become easier to use. This means the programs have become graphical, with drag-and-drop capabilities. Microsoft's **FrontPage 97**, the follow-up to FrontPage 1.1, looks good, based on the early beta version I previewed. The $149 program includes much of FrontPage's old look and feel, but adds integration with the Microsoft Office 97 suite and new features for novice and experienced Web site developers.

As you build a Web site, the new FrontPage 97 toolbar lets you use simple buttons and dialog boxes to drop in HTML code, ActiveX controls, Java applets, or Netscape Navigator plug-ins. You're not required to handle any of the behind-the-scenes code. If you insist on working in HTML code, or want to learn it, you can use the useful color-keyed HTML editor. The colored text makes it easy to follow strings of HTML tags.

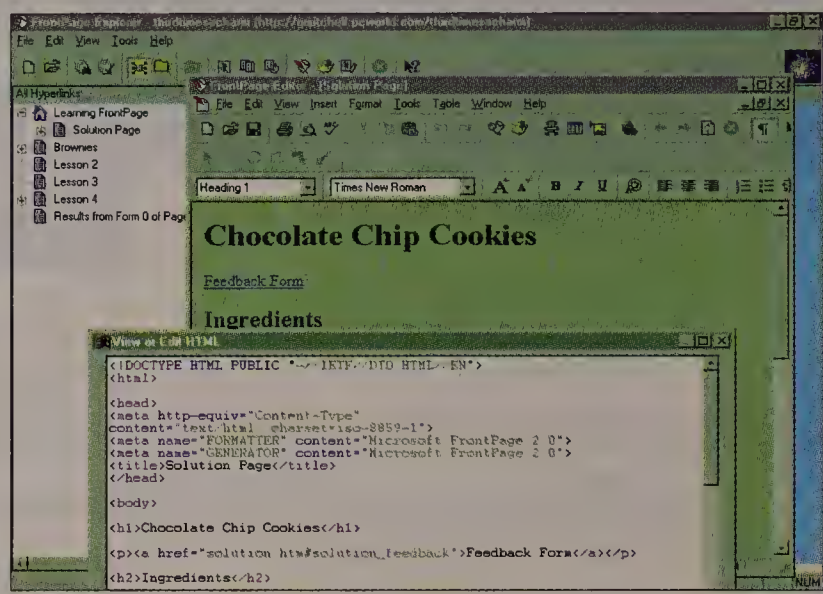
As with FrontPage 1.1, you can use the software to manage your Web site, including links. The WYSIWYG editor shows where links between pages are broken. In this mode, you can also add document, text, or image files, regardless of format. For images, the drag-and-drop process includes automatic file translation to .gif or .jpeg formats.

Microsoft includes many expert-level tools and shortcuts to interactive controls that can make Web sites more interesting. WebBots (predefined CGI scripts) came in version 1.1, but FrontPage 97 includes a WebBot development kit for the adventurous. The program also offers better database connectivity, through the Internet Database Connection Wizard.

FrontPage 1.1 was lambasted for a skimpy manual that made many people shell out extra dollars for a third-party guide. FrontPage 97's manual (which was not ready at press time) has been expanded to be more comprehensive, according to Microsoft.

FrontPage 97 makes it easier for professionals to tinker with a Web page, manage the site, and run it. Microsoft Personal Web Server is bundled with the software.

—Gabrielle Mitchell



FRONTPAGE EXPLORER's visual control over a Web site helps you manage your pages better, even when using the HTML editor.

FrontPage 97

PRO: Visual editor supports hot Web technologies.

CON: Still intimidating to set up a Web site or expand an old one.

VALUE: Worth its cost for Webmasters, good starter for novices.

Microsoft Corp.
800/426-9400
http://www.microsoft.com
Street price: $149

READER SERVICE NO. 747

NEC SuperScript Misses the Boat

PRINTER

NEC's **SuperScript 100C**, priced at $129 after a $40 mail-in rebate, costs less than any other color ink jet printer. But you get what you pay for: This printer will suffice for text documents, kids' projects, and family newsletters, but it fails to deliver sparkling color quality. In *PC World* tests, Canon's $179 BJC-240 produced better-looking results. (For a review of the BJC-240, see this month's Top 10 Personal Printers.) Also, while most ink jets come with software for family projects such as greeting cards, the NEC SuperScript 100C doesn't.

The rated print speeds of the NEC SuperScript 100C are average: 3 pages per minute for monochrome output, 0.3 ppm for color. The unit provides 300-by-300-dots-per-inch resolution in color and 600-by-300-dpi in monochrome. In our tests, text print quality was fine, but color looked grainy. On both coated and regular ink jet paper, a color photo was a bit washed out and less realistic, compared to the output from the Canon BJC-240.

LIMITED DESIGN

As for design, the NEC unit is compact, but it lacks a tray to catch the printed pages. The printer accommodates only one ink cartridge at a time, so you must change monochrome and color cartridges in and out. (Ink jet printers in the $280 price range from Canon and Epson avoid this inconvenience.) Even for the tightest of budgets, the NEC SuperScript 100C is not the best investment to make. Consider other models first.

—Laurianne McLaughlin

NEC SuperScript 100C

PRO: Low price, compact size.

CON: So-so print quality, no bundled software, design problems.

VALUE: Almost everyone should pass on this model.

NEC Technologies
800/632-4636
http://www.nec.com
List price: $129 (after $40 rebate)

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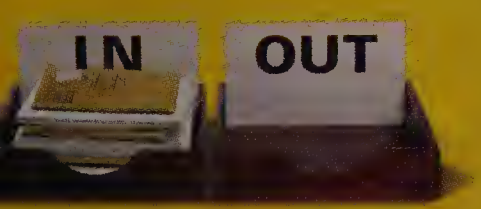

The law of personal computers: What goes in usually just stays there.

All in all, pretty messy stuff.

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So install CleanSweep, the only removal utility that can safely and successfully get rid of unnecessary files for years and years to come.

Get your own copy by visiting your nearest store today. Or call us at (800) 683-6696, code 01111, or pay us a visit at www.quarterdeck.com.

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Web Graphics Tools Add Life to Home Pages

INTERNET

NOWADAYS, IT TAKES more than just basic HTML and static graphics to make people pay attention to your Web site. With Totally Hip Software's **WebPainter** and FutureWave Software's **FutureSplash Animator**, business users now have two new graphics tools for adding lively and interactive animation to their Web pages.

Both of these Windows 95 graphics packages let you create simple animations without learning a programming language. Veterans will no doubt feel comfortable with each program's cel animation tools, such as layering and "onion-skinning" (viewing several frames of an animation at once); novices will need time to learn them. Both provide sample animations and tutorials to help get you started, but no built-in wizards.

The programs produce streaming animations: Files play as they download—but require a plug-in to view. Totally Hip and FutureWave provide free downloadable multimedia players—Sizzler Media Player and FutureSplash Player, respectively, from each vendor's Web site—designed to work with Netscape Navigator 2.*x* and as an ActiveX control with Internet Explorer.

The beta version of WebPainter that we reviewed looked promising for first-time animators, although several tools and features were not yet implemented. WebPainter has a low price and manageable bit-map paint tools. Animation aficionados, however, will prefer FutureSplash Animator's more advanced features, including vector-based drawing tools and interpolated animation, which automatically creates "in-between" frames.

—*Richard Jantz*

FRUITFUL FLYOVER: Using FutureSplash Animator's timeline, you can view an entire animated sequence for a Web page.

WebPainter 1.0

PRO: Low-cost animator.

CON: Plug-in needed to view.

VALUE: A little animation goes a long way.

Totally Hip Software Inc.

604/685-6525

http://www.totallyhip.com

Street price: $100

READER SERVICE NO. 749

FutureSplash Animator 1.0

PRO: Advanced Web animator, vector-based, supports streaming.

CON: Plug-in needed to view.

VALUE: Cutting-edge animation.

FutureWave Software, Inc.

800/619-6193, 619/552-7680

http://www.futurewave.com

Street price: $250

READER SERVICE NO. 750

QUICK TAKES

Cordless Keyboard

It's tough to create a dynamic PC-based presentation when you're hunched over a keyboard and mouse. With Mind Path's **Wireless Keyboard** and **IR50 F/X Remote Control**, you can roam up to 30 feet away from your PC—toting a portable, infrared keyboard and handheld mouse substitute. The remote control includes a disk for moving the cursor and seven user-programmable buttons that can launch presentation effects such as a zoomed view of any application. But they aren't full-time replacements: The keyboard's keys are compressed, like those of a notebook, and the pointing disk lacks precision. The keyboard costs $119, the remote control is $99, and the set of both units is $179. Mind Path, 214/233-9296, http://www.mindpath.com.

READER SERVICE NO. 752

Fujitsu's DynaMO 230: Storage to Go

STORAGE

DO EITHER OF these situations sound familiar? You're developing your company's Web site, with more than 100MB of files to transfer and no direct network connection. You've maxed out your notebook computer's hard drive and you need to run a new program. What do you do?

Fujitsu's new **DynaMO 230 PC Card Drive** is a palm-sized, 230MB (up to 460MB with compression) magneto-optical drive that may solve such problems.

As the first MO drive designed to connect to your computer via a Type II PC Card, it's ideal for notebooks. And the included battery pack makes it truly portable. (However, power lasts only 10 to 55 minutes depending on battery type). If you have Windows 95, then once the DynaMO's driver is installed, you just plug in the PC Card, and you're in business.

We've noted before that magneto-optical media is affordable: Blank disks sell for $10 to $20 each and are about the size of a 3.5-inch floppy. Since these drives use a laser instead of a magnet to read and write the data, they are not subject to the kind of head crashes or data loss that magnetic removable media can fall victim to. While the 65-millisecond access speed is slow compared to a hard drive, it's considerably faster than floppies or even a fast 8X CD-ROM drive; it's a more than fair compromise for the unit's flexibility and portability.

—*Gordon Meier* ▶

Fujitsu DynaMO 230 PC Card Drive

PRO: Compact size and weight (under 1 pound), included battery make it truly portable.

CON: Blank MO media not widely available.

VALUE: Good long-term option for frequent travelers.

Fujitsu Computer Products of America, Inc.

800/626-4686

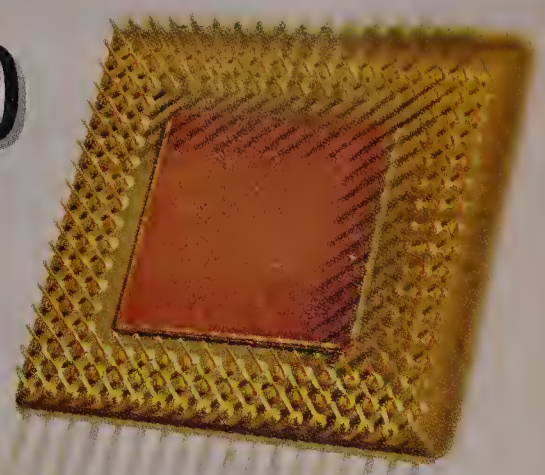
http://www.fcpa.com

List price: $499

READER SERVICE NO. 751

QUARTERDECK®

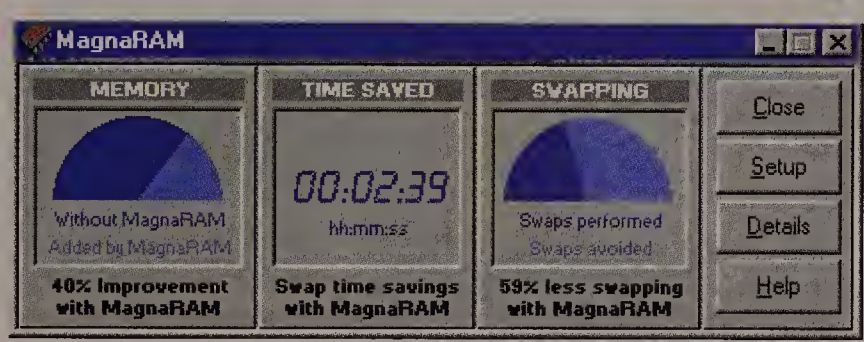
AUTOMATICALLY GET MORE SPEED AND MEMORY. THE ALL-NEW MAGNARAM™ 97 DELIVERS.



Now Run Your System More Efficiently with MagnaRAM 97, the 32-bit Memory Optimizer from Quarterdeck!

Accelerate Windows 95!

Want more speed? You need sophisticated, powerful Windows 95 memory optimization. MagnaRAM works behind the scenes to boost your memory and cut the time it takes to load your 32-bit programs. MagnaRAM's memory compression keeps more data in faster RAM, instead of swapping it out to your hard drive. And when swapping does occur, MagnaRAM stores and retrieves information more quickly than Windows can by itself. You'll get snappier overall performance, and the power you need to blast through your work.



The all-new MagnaRAM 97 control panel displays real-time performance improvements at a glance

EXCLUSIVE Start Programs Faster with Revolutionary TurboLoad™!

Slash the time it takes to load your 32-bit applications in Windows 95.* MagnaRAM's innovative *TurboLoad* feature monitors the way those 32-bit programs load, and ensures they'll get into memory faster… next time and every time. With TurboLoad, you'll get down to business as quickly as possible.

Get More Memory for Windows!

The top scientists in the field of memory management (the same people who brought you QEMM®) have done it again! MagnaRAM's unique *CacheBack*™ cache management system automatically recovers underused memory from the hard drive cache under Windows 95 and Windows for Workgroups. The upshot? Even more memory to work with! And for Windows 3.1 users, MagnaRAM's memory optimization means more usable memory — and that gives Windows 3.1 extra room for more data and larger programs. MagnaRAM kicks in when Windows runs out of gas — precisely when you need it the most!

MagnaRAM 97 is safe and easy to use. Buy it today, and see what your PC can *really* do.

The more memory you have, the more MAGNARAM 97 can do for you!

Visit your nearest store or call (800) 683-6696 to order.

Ask for code 01055. Check out Quarterdeck's Web Site @ http://www.quarterdeck.com/

BEST BUY · COMPUSA · COMPUTER City · EGGHEAD · Fry's ELECTRONICS · MICRO CENTER · Office DEPOT · software · STAPLES The Office Superstore

Circle 185 on reader service card

*Results may vary with your application and system configuration.

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For more information, or to read a White Paper on how MagnaRAM 97 can provide you with more speed and memory, just visit our Web Site at http://www.quarterdeck.com/

Java Layout Tool Gives Web Sites a Jolt

INTERNET

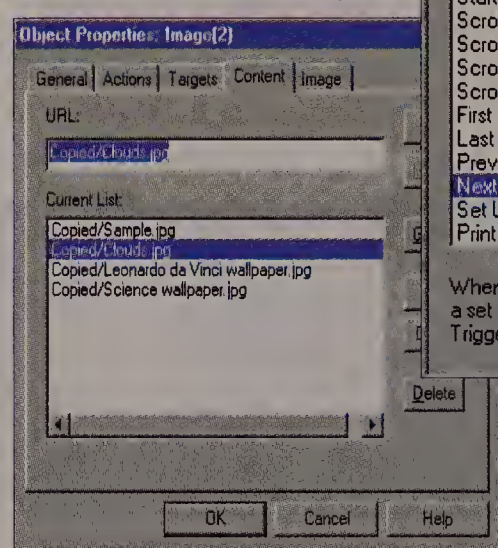
HTML IS A TERRIFIC standard with universal appeal, but its text-based tag format makes compelling and dynamic designs difficult to create. Enter FutureTense's **FutureTense Texture 1.1**, a Web-page design program that goes beyond the limits of HTML by outputting Java code. The software uses the familiar frame-based page-layout metaphor of Quark XPress, allowing users to drag and drop text, objects, and controls on screen. The result: professional-level animation and layouts without enormous design costs or long hours of coding. We looked at version 1.0, which will be replaced by the newer edition.

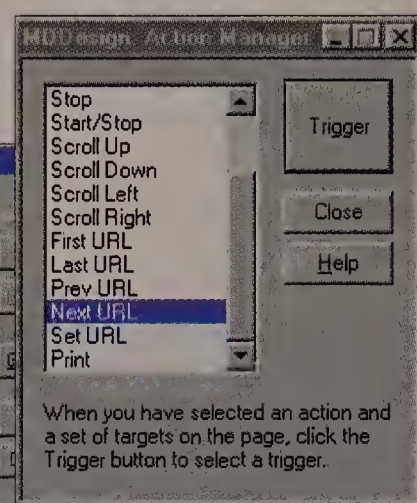
Users employ icon-based tools to add text frames, object shapes, images, and links. Text frames can be linked so that text flows from one box to the next, making it simple to design columns and other complex text layouts. Another tool lets you set up timing sequences for animations and actions, so that text can scroll up a page or a graphic can appear after a set delay, for example. And objects can be assigned a behavior or specific action using the Action Manager; the tool will also link the object to URLs and files.

The Texture program provides outstanding text handling, downloading needed font outlines on the fly for display in Web pages. While this feature is a major advantage over HTML's limited font resources, it also requires users to view Texture-designed pages with the Texture Viewer to see the fonts.

Though the tools look simple, they can still be difficult to use and have some limitations. Shapes, for example, are only the most generic boxes and circles, and Texture lacks object animation capabilities.

—Michael Desmond





MANAGE YOUR WEB elements via the Action Manager and Object Properties dialog.

FutureTense Texture 1.1

PRO: Familiar page-layout interface and impressive Java output for Web designers.

CON: Simplistic layout tools, requires viewer software for best effect.

VALUE: We like it.

FutureTense

800/880-7613

http://www.futuretense.com

List price: $695

READER SERVICE NO. 753

QUICK TAKES

Language Lessons

Just about everybody learns at least one foreign language in school—but without regular practice, most of us get awfully rusty in short order. If you need a refresher course, or want to start from scratch, try one of Transparent Language's **LanguageNow 5.0** CD-ROMs. Available in French, German, Italian, Latin, Russian, and Spanish editions, these $129 multimedia self-study courses aren't cheap, but they are comprehensive. They let you delve into a foreign language and culture by reading short stories and articles, watching TV commercials, and playing games. Elements include word definitions and variable-speed audio tracks. You can record, then play back your pronunciations and compare them to those of a native speaker. Transparent Language, 800/752-1767, 603/465-2230, http://www.transparent.com.

READER SERVICE NO. 758

A Style Catalog for the Web

INTERNET

BUSINESSES MIGRATING to the World Wide Web have hit more than a few potholes. A lack of technical and design expertise is one of the chief causes of the bumpy ride. For the hopelessly disorganized and those with designs on Web producer positions, a solution may be DigitalStyle's **WebSuite 2.0.**

WebSuite is basically a style catalog of Web page components, neatly organized into style groups. Each style follows a consistent theme throughout the design of your site: If you use the headline styles, rules, bullets, buttons, icons, and backgrounds in the group, you won't have to worry about whether elements clash. And as you gain confidence in your aesthetic abilities, you can customize the style groups or create your own.

WebSuite 2.0 promises even more power than its predecessor, WebSuite 1.1. The new version includes wizards that walk you through your style selection. The wizards also integrate with Microsoft's Web authoring software, FrontPage 97, so you won't have to toggle between the apps.

Does Java give you the jitters? WebSuite contains caffeinated components that incorporate animation and interactivity into a Web site.

The program's standard edition comes with 10 style groups, the designer edition with 30. A $59 subscription service provides a new style group every month for a year.

—John Mello ▶

WebSuite 2.0

PRO: Professional-looking results.

CON: Styles can limit your look.

VALUE: Good for any Web designer.

DigitalStyle Corp.

619/673-5050

http://www.digitalstyle.com

Street price: standard edition $99, designer edition $199

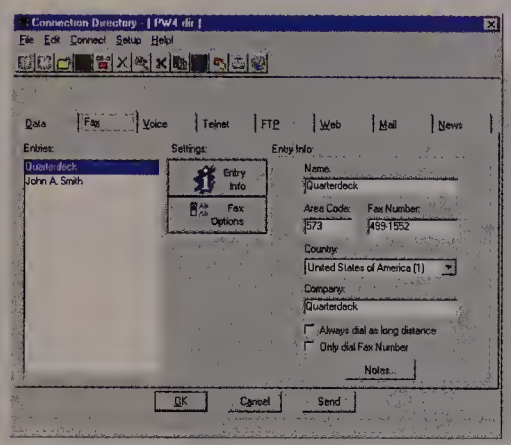
READER SERVICE NO. 754

QUARTERDECK®

MAKE THE WORLD YOUR OFFICE™

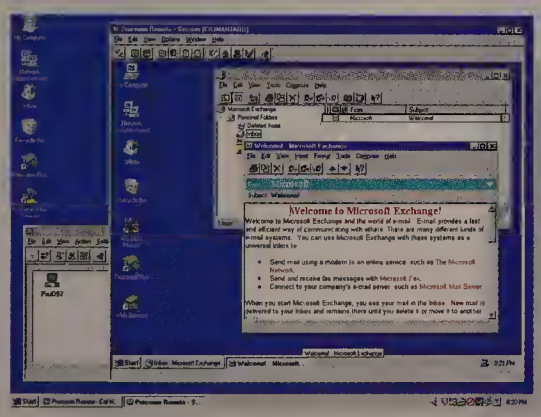
Introducing Procomm Plus® for Windows 95.

Data Communications, Fax, Remote Control and Internet All in One!



Now, the most powerful data communications program available gives you point-and-click access to everything you need. From wherever you happen to be. Send or receive faxes, connect to a host computer, get on the web, or access a program on another computer from a remote location. The *Connection Directory* stores all of your key telecommunications information — one click automatically adjusts your PC's system settings to make the connection!

New! Remotely Access Any PC or Network

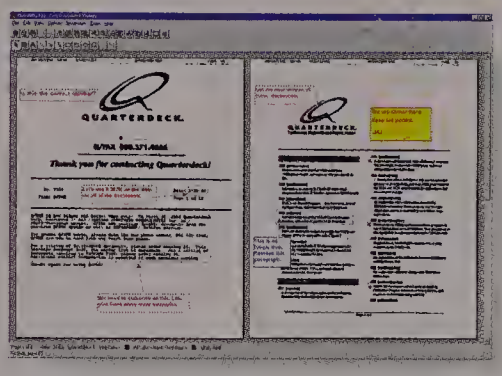


Access your PC from another computer with the fast and powerful *Procomm Remote*. It gives you full remote access to your PC's files and applications. And a full range of security features restricts access to your PC and everything on it.

Connect to a Wide Range of Corporate Hosts and On-Line Systems

Procomm's famous *Terminal Emulations* enable you to access a variety of on-line and corporate host systems quickly and easily. Connect to any mainframe-, mini- or PC-based source by using your own PC as a remote terminal.

Fax Facilities at Your Fingertips



Procomm Plus' advanced fax features give you a wealth of options for electronic faxing. Just click once, and you'll see the exact status of any fax received or pending delivery. *Fax Viewer* cleans up those annoying "scan lines" on faxes you've received. You can use *Fax Annotation* for editing, adding graphics and including your comments directly on a fax to a colleague or a friend. *OCR* converts faxes to character-based data, slashing the time it takes to retype information.

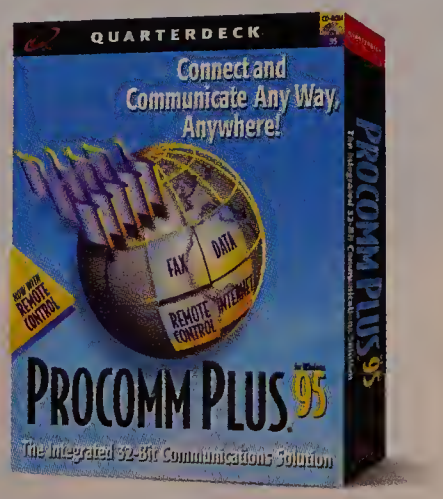
New! Explore the Internet with Ease

Procomm Plus now comes with the Microsoft® Internet Explorer, giving you advanced 32-bit access to the Web. With support for HTML 3.0, frames and Java, you can view all the latest Web sites in their richest graphics formats. For a completely integrated Internet solution, Procomm Plus includes Internet mail, news reader, Telnet and FTP clients.

And, because Procomm Plus for Windows 95 is the first 32-bit communications program to integrate remote control, fax, data and Internet, you can run all four features at once!

So go ahead and communicate any way you want. From anywhere. With Procomm Plus, the world is your office.

Get your own copy by visiting your nearest store today. Or call us at (800) 683-6696, code 01711, or pay us a visit at www.quarterdeck.com



Circle 189 on reader service card

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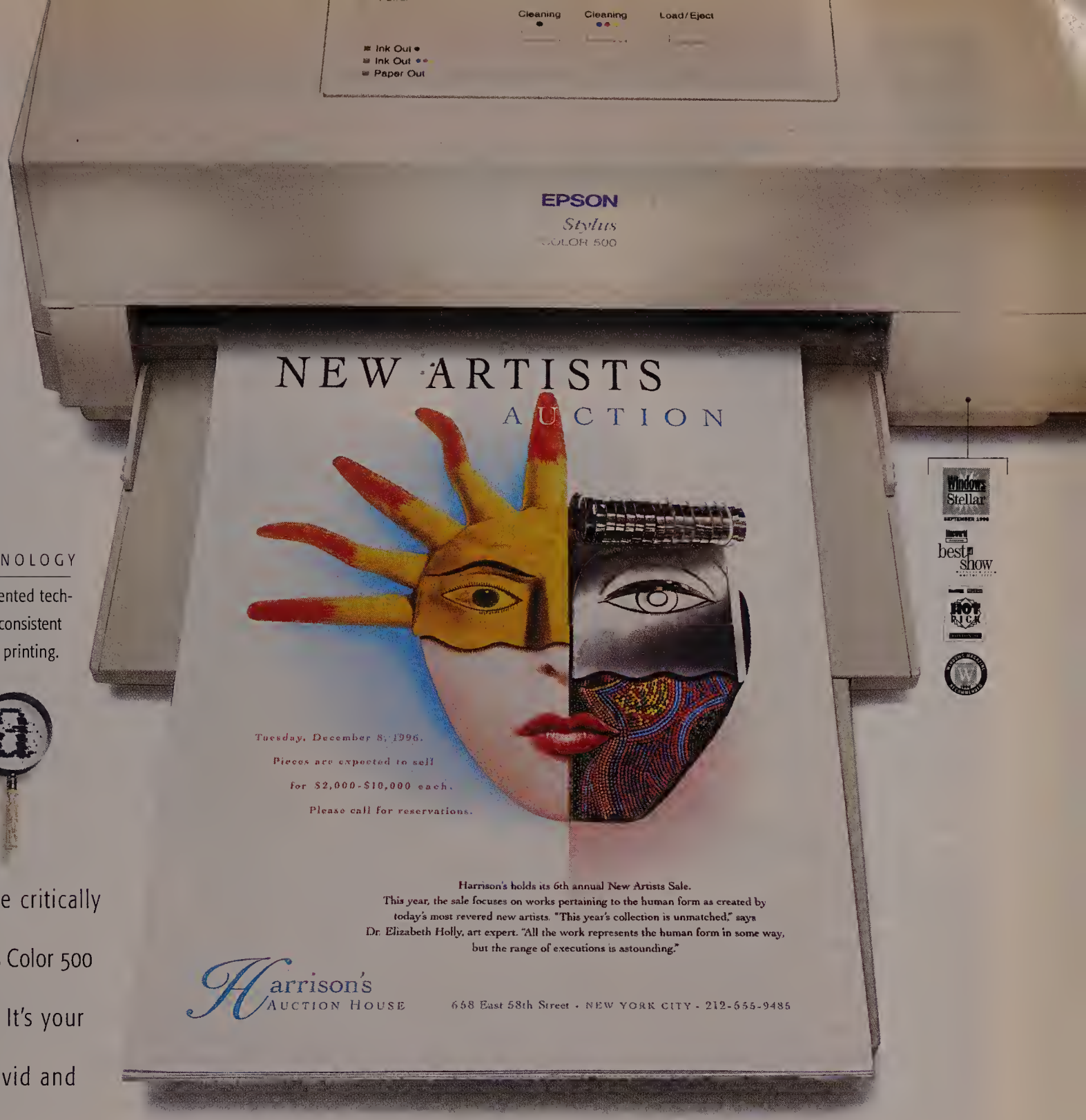
to really appreciate how state-of-the-art it is, just look at the art

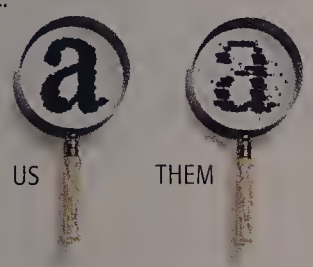
EPSON STYLUS' COLOR 50

Black and color on premium paper	720 x 720 dp
Black and color on plain paper	720 x 360 dp
Now for only $289.00	
CALL 1 800 GO EPSON ASK FOR OPERATOR 3064	www.epson.co



Piezoelectric Technology

Unlike thermal printing, our patented technology provides a cleaner, more consistent dot with no splatter for sharper printing. Just look.



What comes out of the critically acclaimed EPSON Stylus Color 500 isn't just a document. It's your ideas in their most vivid and inspiring form. Made possible by Epson's Piezoelectric technology—our patented method of getting ink onto paper. Unlike thermal printing where the ink is heated until it splatters, our exclusive technology uses an electronic pulse to force ink through the printhead with precision. You'll appreciate the results—dots that are cleaner and more consistent. 720 x 720 dpi PhotoQ Photo Quality images for accurate color, detail and less graininess. And laser-quality black text. (All at print speeds faster than you ever imagined.) It adds up to a stunning output. Or the difference between presenting an idea and unveiling a masterpiece.

YOU'VE GOT TO SEE IT IN EPSON COLOR.™

The "a" character comparison is based on actual print samples from the EPSON Stylus Color 500 and the leading ink jet competitor printed on premium paper. Street price may vary. EPSON and EPSON Stylus are registered trademarks of Seiko Epson Corp. © 1996 Epson America, Inc.

Affordable Scanners Handle Small Photos

SCANNER

YOU DON'T NEED a big, expensive scanner to do creative work with photographs: Two compact new scanners from Polaroid and Storm Technology do the job. These affordable units have similar capabilities including 24-bit color, 400-dpi optical resolution, and a 4-by-6-inch maximum scanning area. The Storm scanner is less expensive and easier to use, but requires more effort to install.

The $249 **Polaroid PhotoPad** takes up less desk space than a mouse pad. Installation is hassle-free, since the scanner connects to your PC's parallel port (with a pass-through adapter for your printer). My laser printer continued to work without incident. After a simple calibration routine (just scan in one glossy print), the scanner works well. Because the PhotoPad's feed mechanism pulls the prints straight through, there's little risk of your photos bending. But note that the device can't be pushed up against a wall. It needs some unobstructed space in back of it to allow photos to pass through.

The Polaroid scanner offers a big advantage because it is external and hence portable: You can use it with several PCs in your office or take it home for the weekend.

Storm Technology's $199 **EasyPhoto Drive,** which fits into an empty 5.25-inch drive bay, is the first internal photo scanner to be sold in retail stores. (Nikon's Coolscan, another internal scanner, works with 35mm slides.) If you have the space in your PC, the EasyPhoto Drive is the handiest photo scanner on the market. The trade-off is that it requires a bit of elbow grease to install. You have to insert the unit in an open bay, plug in a jumperless ISA interface card, connect the scanner drive to the card, and attach the power cable. But if you want the easiest-to-use scanner, this is it. After calibrating the device, you just insert a photo, and the EasyPhoto Drive automatically pulls it in and launches the scanning software. The scanner ejects the photo when it's finished.

Both scanners come with Storm Technology's EasyPhoto software, which includes all the standard tools you need to edit and enhance photos, including color and exposure adjustments.

The software also has a handy image management feature that lets you store scanned images in separate galleries, so it's easy to stay organized. You can drag and drop these images onto documents such as newsletters.

If you don't need to scan larger-size photos, either of these scanners is a good choice, based on my experience with shipping units.

—*Richard Jantz* ▶

SNAP IT UP: The diminutive Polaroid PhotoPad scans pictures easily.

Polaroid PhotoPad

PRO: Low price, easy to install.

CON: External unit requires desktop space.

VALUE: Excellent for beginners.

Polaroid Corporation

800/343-5000

http://www.polaroid.com

Street price: $249

READER SERVICE NO. 759

EasyPhoto Drive

PRO: Simple to use, internal unit.

CON: Somewhat tricky to install.

VALUE: Worth the effort.

Storm Technology, Inc.

888/438-3279

http://www.easyphoto.com/storm/

Street price: $199

READER SERVICE NO. 760

QUICK TAKES

Better Internet Phone Calls

Carrying on an audible conversation using an Internet phone requires more than good software. You need a microphone headset that picks up your voice clearly, while filtering out as much background noise as possible. In informal testing, Andrea Electronics' **Anti-Noise Computer Headset ANC-100** improved transmission quality dramatically. List-priced at $59.95, it looks almost like an ordinary phone headset. Using the vendor's noise cancellation technology, the unit strips out background voices, music, and traffic, for a clean transmission. The headset also works with speech recognition and video conferencing software. Andrea Electronics, 800/707-5779, http://www.andreaelectronics.com.

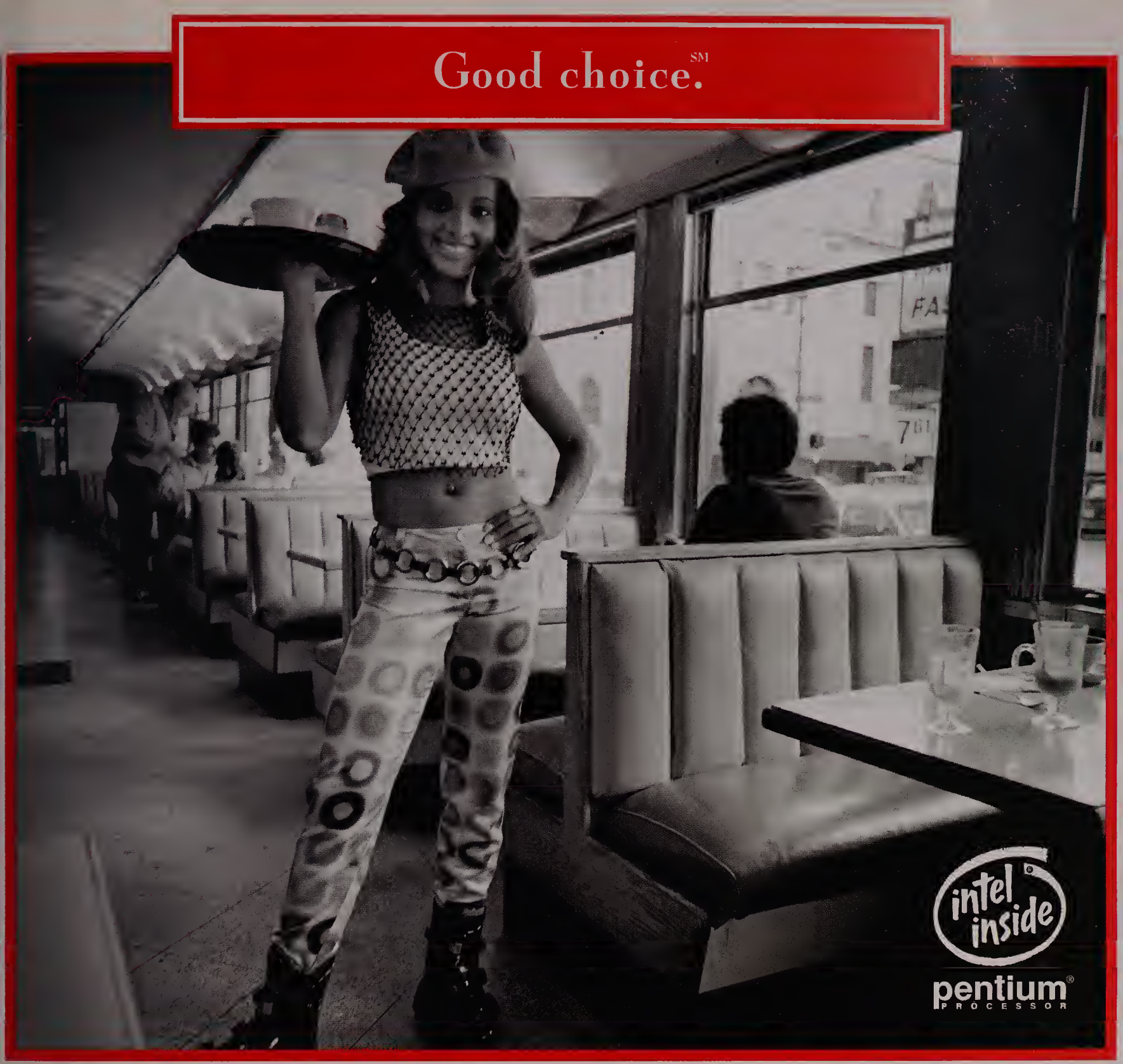
READER SERVICE NO. 761

Making Teams Work

The better that managers understand their teams, the better the results, says a new CD-ROM from Harvard Business School. **Teams That Work** is aimed at helping managers exploit the potential of the groups under their command. The interactive program explains team dynamics, how to understand them, and how to mold them. The disc also lets managers take part interactively in simulations of potential challenges, so managers can make mistakes in virtual rather than real time. This professional program is well organized, and its information is valuable. Teams That Work licensing rates start at $450 per person for 25 to 49 users. Harvard Business School Publishing, 310/278-0963, http://www.hbsp.harvard.edu/.

READER SERVICE NO. 762

Good choice.℠



At Phil's Café, "Monday's Chef's Special" is the obvious choice. And when it comes to buying a computer, the choice is just as clear. Choose Quantex and you'll always get the finest, name-brand-only components and state-of-the-art technology, at a competitive price. Period.

Precision engineering. **ISO 9002** certification of our manufacturing facilities reaffirms our conformance to the strictest standards. Each system is 100% Novell Certified, too. Choose Quantex and you choose reliability

State-of-the-art technology. Quantex gets it to you first. This month, we're featuring three new technologies: 12X CD-ROM, Video Phone, and ISDN.

Responsive care after the sale. Featuring our NEW! 3-Year Warranty, the Quantex Care Package bolsters our commitment to you. Make the Right Choice. Give us a call today.

QUANTEX
GOOD CHOICE.℠

Videophoning. The gift of presence.

HOME series

Full screen video phone image is for illustration purposes only.

The Quantex Video Phone PC keeps the home fires burning. It's holiday time and the candles are burning low. You're missing her. Is she missing you? You reach for the phone to call. She answers. You decide to try something new. You both boot up your Quantex QP5/VM-1's with Video Phone/Intel ProShare™ technology which connects your two computers over a standard phone line. In just seconds, her sparkling face is displayed in the "Guest Window" on your PC screen with simultaneous audio and video. Now you can toast the memories together in a whole new way.

Grandparents enjoying their new Quantex Video Phone PC

Sound like incredible holiday magic? It is. And the magician is Quantex, working side-by-side with Intel to bring you *the first Video Phone available on a home PC!* Video Phone is now standard fare with the Quantex VM-1 Systems over a single, plain old telephone wire. No installation struggles, and meticulously engineered for your Quantex machine to give you true "plug and play" performance. Video Phone from Quantex is anamazing phenomenon to share with your college-bound kids, distant friends, closest relatives, even your colleagues--on special days and everyday.

Upgrade specials

- MS Natural Keyboard (Upgrade from the 104-Key Keyboard) . . . $39
- MS Sidewinder 3D Pro Digital Joystick $59
- HP Color Deskjet 680c Printer (Covered by manufacturer's warranty only.) . $299
- Altec Lansing ACS-400 Surround Sound Speakers w/ACS-250 Subwoofer. . . . . $120 (Upgrade from PCs with Altec ACS-40 Speakers)
- 12X EIDE CD-ROM Drive . . . . . .Call

With 3-D dazzle from Quantex, New Year's resolutions are gonna be a lot more fun! Picture exquisite "reach out and touch it" depth, flawless resolution, smooth as silk video playback, and you're talking 3-D dazzle from Quantex's VM-1 systems. Our state-of-the-art 3-D offering will enhance all your Windows 95® 3-D-based applications and will give even dedicated game machines like Nintendo and Sega a run for their money! **Deck the halls with the Ensoniq™ Soundscape VIVO-90 Sound Card!** Since only the best is good enough for Quantex, we present home-theater quality sound by Ensoniq. Featuring an advanced 32-bit wavetable synthesizer with a mind-blowing 90dB digital audio record/playback, the VIVO-90 leads by example. So go ahead play a little James Brown while you work. We won't tell.

Sound Card Comparison

	Direct X Support	Modem Connection	VideoPhone Connection
Ensoniq-Vivo90	Yes	Yes	Yes
Sound Blaster AWE32	No	No	No
Gravis UltraSound P&P Pro	No	No	No

Biggest. Best. Brightest. We bring it to our customers, first. Quantex. Good Choice.

intel inside pentium® PROCESSOR

3 YEAR LIMITED WARRANTY

FEATURING VIDEO PHONE

QP5/133 VM-1 $1949

Business lease:$ 69/month

- Intel® 133MHz Pentium Processor
- 16MB EDO Memory / 512KB Pipelined Burst Cache
- 2.1GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- Diamond Stealth 3D 2000 w/4MB EDO DRAM
- MAG 15" .25dp Digital Monitor (14.0" viewable) w/SONY Trinitron Tube
  Upgrade to Mag 17" monitor (16.1" viewable) for $200
- Intel **DSVD** 28.8 Kbps Fax/Modem
- Toshiba 8X 135ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Family Software Bundle (Preinstalled)
- Special VideoPhone and Intercast Bundle
- Video Phone Camera
- Intel Video Capture Card w/TV Tuner
- 3-year limited Warranty

QP5/166 VM-1 .....$2149
QP5/200 VM-1 .....$2249

QP5/133 M-2 $1649

Business lease:$ 58/month

- Intel 133MHz Pentium Processor
- 16MB EDO Memory / 256KB Pipelined Burst Cache
- 2.1GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- STB 64-bit Virge 3D w/2MB EDO DRAM
- MAG 15" .25dp Digital Monitor (14.0" viewable) w/SONY Trinitron Tube
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 8X 135ms EIDE CD-ROM Drive
  Call for special upgrade to 12X EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-40 Speakers
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Family Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/120 M-2 .....$1599
QP5/150 M-2 .....$1749

QP5/166 M-3 $2099

Business lease:$ 74/month

- Intel 166MHz Pentium Processor
- 16MB EDO Memory / 512KB Pipelined Burst Cache
- 2.1GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- Matrox Mystique 3D w/2MB SGRAM
- MAG 17" Digital Monitor (16.1" viewable)
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-40 Speakers
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Family Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/133 M-3 .....$1899
QP5/150 M-3 .....$1999

QP5/200 M-4 $2399

Business lease:$ 84/month

- Intel 200MHz Pentium Processor
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- MAG 17" Digital Monitor (16.1" viewable)
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- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mini-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Family Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/133 M-4 .....$2099
QP5/166 M-4 .....$2299

Family Software Bundle

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- Quicken SE
- Comptons: Interactive Encyclopedia, Zoo Explorer
- Comptons Reference Collection
- BodyWorks 5.0
- Me & My World Multimedia Dictionary
- Mecklermedia's Official Internet World™ Internet Yellow Pages
- The Modern Age Books Windows95 Primer
- America Online, Prodigy, CompuServe-(one month trial each)
- NetCruiser Plus (Over 400 hrs of free Internet access for one month)
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- HP Laserjet 5L Printer (Covered by manufacturer's warranty only.) $479
- Intel EtherExpress™ PRO/10+ LAN Adapter (ISA 10 Base-T) $59
- Intel EtherExpress™ PRO/100 LAN Adapter (PCI 100 Base-T) . . . $119
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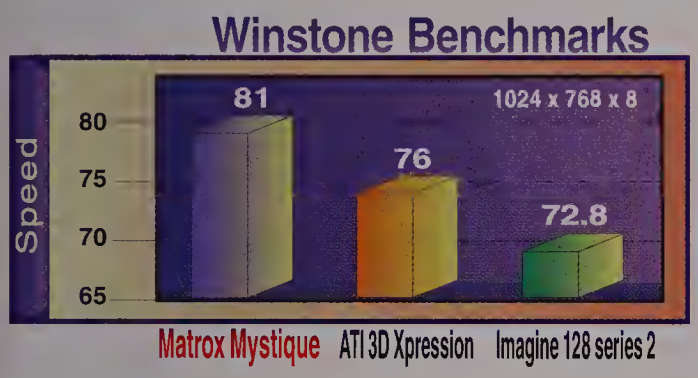

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- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-40 Speakers
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Professional Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/120 SM $1649
QP5/150 SM $1799

QP5/166 SM-1 $1999

Business lease: $ 70/month

- Intel 166MHz Pentium Processor
- Intel 430VX PCI Chip Set
- 24MB EDO Memory / 512KB Pipelined Burst Cache
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- 3.5" 1.44MB Floppy Drive
- Matrox Mystique 3D w/2MB SGRAM
- MAG 15".25dp Digital Monitor(14.0" viewable) w/SONY Trinitron Tube
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mid-Tower Case
- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Professional Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/133 SM-1 .....$1799
QP5/200 SM-1 .....$2099

QP5/200 SM-2 $2399

Business lease: $ 84/month

- Intel 200MHz Pentium Processor
- Intel 430VX PCI Chip Set
- 32MB EDO Memory / 512KB Pipelined Burst Cache
- 2.5GB EIDE Mode 4 Hard Drive
- 3.5" 1.44MB Floppy Drive
- Matrox MGA Millennium w/2MB WRAM
- MAG 17" Digital Monitor (16.1" viewable)
- 33.6 Kbps Fax/Modem w/Voice Mail and Speakerphone
- Toshiba 12X 125ms EIDE CD-ROM Drive
- Ensoniq VIVO-90 32-Bit Wavetable Synthesizer
- Altec Lansing ACS-45 Speakers w/Subwoofer
- Mid-Tower Case
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- MS Windows '95 With MS Plus
- Professional Software Bundle (Preinstalled)
- 3-year limited Warranty

QP5/133 SM-2 .....$2099
QP5/166 SM-2 .....$2299

QP6/200 SM-3 $2799

Business lease: $ 98/month

- Intel 200MHz Pentium Pro Processor
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- Altec Lansing ACS-400 Speakers w /ACS-250 Subwoofer
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- 104-Key Keyboard With MS PS/2 Mouse
- MS Windows '95 With MS Plus
- Professional Software Bundle (Preinstalled)
- 3-year limited Warranty

QP6/180 SM-3 .....$2699

For information on non-multimedia Pentium workstations, consult with your sales representative.

Professional Software Bundle

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- Corel: Internet Mania, Print House
- Quicken SE
- Comptons: Interactive Encyclopedia, Reference Collection
- Resume Designer
- Mecklermedia's Official Internet World™ Internet Yellow Pages
- The Modern Age Books Windows95 Primer
- Key Master Maps
- America Online, Prodigy, CompuServe-(one month trial each)
- NetCruiser Plus (Over 400 hours of free Internet access for one month)
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Lightweight Speakers, Heavy-Duty Sound

SPEAKER

WHO WOULD HAVE thought it possible to get decent sound out of such tiny, bantamweight speakers? Not this jaded reviewer. But thanks to Altec Lansing's **ACS20** compact speakers and New Media's LapTalk Speakers, I am a believer.

The self-powered $99 Altec Lansing speakers weigh just two pounds, and are contained in a compact base that lets each speaker swivel open for better separation of audio channels. You can't disconnect the speakers from the base, but you don't have to deal with connection cables. The AC power supply offers variable voltage for other countries.

Altec Lansing has fashioned their speaker enclosures to allow for a deep bass audio without the need for a subwoofer. But there's a jack for a subwoofer add-on to let you pump up the volume. You also get a canvas carrying case.

SPEAKERS A-GO-GO

NEW MEDIA'S $200 rich-sounding, detachable **LapTalk Speakers** require no AC adapters or batteries. They take the juice they need by connecting to a notebook's PS/2 port. The pair have a sort of yin-yang design for compact storage, and then snap apart. Like the Altec Lansing speakers, the units connect to the headphone port on a notebook. The speakers also have a built-in microphone and headphone port.

The PS/2 port power connect is ingenious, but caused me problems. Some notebooks expect only a keyboard or a mouse to be connected through that port. When I installed to my Gateway 2000 Solo notebook, I got a "keyboard failure" message and a frozen system; yet the speakers worked fine with Toshiba and Compaq units. Some PC BIOSes may be incompatible or require tweaking for the LapTalk speakers to work.

—Michael S. Lasky

Altec Lansing ACS20

PRO: Big sound from little speakers designed to travel.

CON: Requires AC power to operate.

VALUE: Sounds great, inexpensive.

Altec Lansing Technologies Inc.

800/648-6663

http://www.altecmm.com

List price: $99

READER SERVICE NO. 763

LapTalk Speakers

PRO: Requires no external power source or batteries.

CON: Unique PS/2 power connection may not work with all notebooks.

VALUE: Worth the investment.

New Media Corp.

800/648-6663

http://www.newmedia.com

List price: $200

READER SERVICE NO.764

QUICK TAKES

Translate Foreign Web Pages

Not all interesting Web sites are in English. **Globalink Power Translator 6.0** for Windows 95 and NT can help. We used a beta copy. The software translates Web pages written in French, German, Italian, or Spanish into English, and vice versa. (It takes a hefty 60MB of disk space if you copy all its dictionaries.) The translations aren't perfect: Web sites don't conform to many rules, linguistic or otherwise. But Power Translator does give you a good understanding of what a non-English document says. List price is $149. Globalink, Inc., 800/255-5660.

READER SERVICE NO. 767

PC Bags for the In Crowd

GEAR

BY NOW, MOST of us have heard warnings about thieves who look for computer bags. How can you disguise your portable in a convenient carrier? The Outdoor Recreation Group and Respect Inc. offer two new takes on the PC tote.

After a few days with Outdoor's **PC Traveler**, I was hooked. The back of this nylon bag has a padded slot for your notebook, with a Velcro tab at the top that seals. The PC Traveler's wide-mouth, zippered opening is at the top of the bag, which comes with several handy pouches in front. The flap cover also has a zippered pocket. The downside: There's no designated place for the powerbrick. But the $60 bag seems sturdy. It comes with several strap options, even backpack straps.

Respect's $98.99 street-inspired **LapPak**, on the other hand, is ideal for the computer wunderkind. The rubberized red, white, and black backpack also comes in solid black. Equipped with industrial-looking closures and lots of metal, the LapPak holds your notebook in place even when in use. The backpack unzips three-quarters of the way around, so you can open the bag but keep your portable protected. The backpack straps also unzip, letting you carry the bag like a tote.

These bags' designs are more casual than most business people may want, but they do work as disguises.

—Gabrielle Mitchell ▶

NOTEBOOK PC DISGUISE: The LapPak totes your gear.

PC Traveler

PRO: Multiple strap options, solid construction.

CON: Items can get lost in pockets.

VALUE: Good alternative to standard carrying case.

The Outdoor Recreation Group, Inc.

213/226-0830

Street price: $60

READER SERVICE NO. 765

Respect LapPak

PRO: Solid construction, holds notebook in place.

CON: Funky fixtures may not suit most adults.

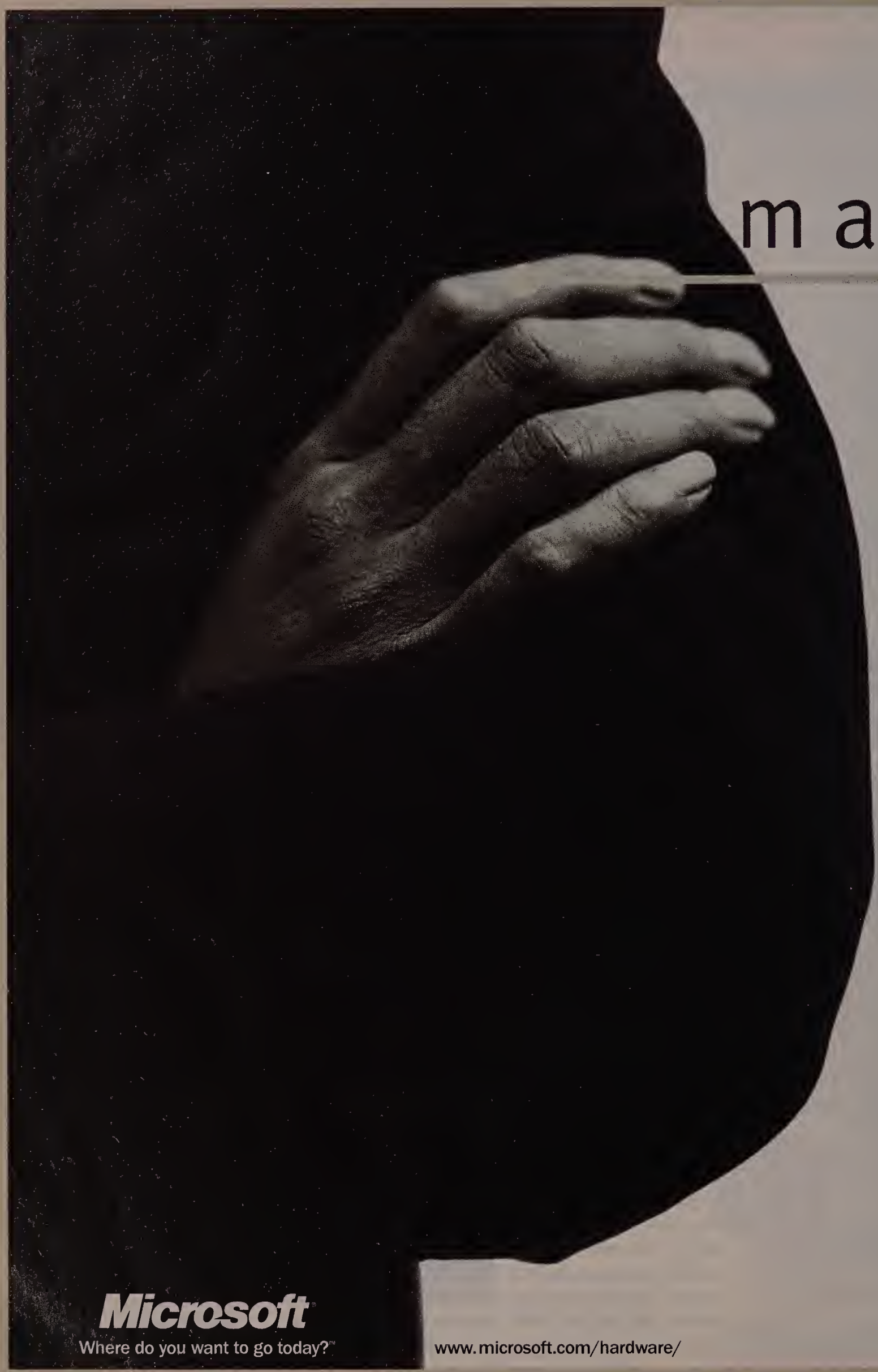
VALUE: Best for college students.

Respect Inc.

415/512-8995

List price: $98.99

READER SERVICE NO. 766



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for each other.

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your fingers would all be the same length,
your palms would be flat and your wrists bent.
But this is not how the human hand
is constructed and this is not how
the Microsoft® Natural Keyboard® is designed.
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Because the shape of your hands defines
the shape of the keyboard,
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With your hands ergonomically poised,
you compose with greater ease.
You are naturally better able to perform.
Nothing comes between you and your ideas.

Now you are prepared
to get something accomplished.
Take advantage of special keystroke timesavers
built-in to simplify your most repetitive tasks.
This could make the difference between
striving to keep ahead of your workload
and positively gliding through it.

The Microsoft Natural Keyboard;
it will feel different, because it is.
Then it will feel very right, because it is.
Now go and put your hands on one
because it's the feeling of each and every key
under your fingers that will persuade you.

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Clarion M10 Allows Wireless Networking

NETWORKING

VARIOUS INCARNATIONS of wireless PC networks have been around for years. They're usually expensive, difficult to install, and considerably slower than the conventional hard-wired variety.

Clarion, however, claims its **MerLAN M10** transceiver is the first plug-and-play wireless LAN product that's Ethernet compatible and reaches a speed of a full 10 megabytes per second.

The M10 transports data using spread-spectrum radio, a technology that continuously hops among frequencies. Spread-spectrum radio delivers high security (the military uses it) and reduces interference from other radio signals.

Although you could theoretically connect an M10 transceiver directly to each PC in an office and have the PCs instantly communicate sans wires, the M10's $3995 price tag is too steep to make that a viable option.

A typical setup is to connect M10 transceivers to workgroup hubs or routers on your LAN: Once the transceivers are installed, several workgroups can communicate wirelessly between floors or even between buildings. The maximum range between two standard M10 units is about 300 feet. Clarion claims the range between buildings can be several miles if you add optional antennas.

Clarion did not send us a unit for testing in time for this article, so we can't comment on the installation process or on performance. But even if your installation happens to go without a hitch, at about $8000 for a minimal two-unit setup, the M10 is unfortunately pricey.

—*Stan Miastkowski*

GO WIRELESS: The Clarion MerLAN M10 creates plug-and-play wireless networks.

MerLAN M10

PRO: Networking sans wires.

CON: Not for the lean of budget.

VALUE: Too soon to tell.

Clarion Corp. of America

201/818-1166

List price: $3995

READER SERVICE NO. 768

IBM's Pentium Pro Systems

DESKTOP

IBM HAS REPLACED its PC 360 Pentium Pro systems with the **PC 365** line—three Pentium Pro desktop systems designed to attract corporate power users as well as MIS personnel. The PCs incorporate some of this fall's newer technologies, plus features that should make managing the systems simpler.

All three models support a Universal Serial Bus port, Concurrent PCI, the TME 10 NetFinity Web feature for PC management through the Internet or an intranet, and the option for a second Pentium Pro CPU. Each system's hard drive has self-monitoring technology that can warn you before it fails. The PC 365 Models 1 and 2 have 1.6GB EIDE hard drives with bus-mastering controllers; the Model 3 incorporates a 2.1GB Fast&Wide hard drive with an Ultra SCSI controller. All three support 4-megabytes-per-second wireless infrared data transfer (the new, faster standard) and Wake-on-LAN technology, for remote power up and management—though these features require a separate $80 infrared transceiver and a $120 network card, respectively.

The $2400 Model 1, with a PPro-180 CPU, 16MB of EDO RAM, and S3 Trio64 V+ video controller, comes ready to configure, with no operating system. The $3200 Model 2, with a PPro-200, 32MB of EDO RAM, an 8X CD-ROM drive, and S3's Trio64 V+ video controller, comes with Windows NT 4.0. The $4440 Model 3, with a PPro-200, 32MB ECC RAM (an expensive and particularly reliable type of RAM), a 6X PD/CD-ROM drive, and Matrox Millennium video controller, also offers Windows NT 4.0. All three systems include CoSession for remote tech support, QAPlus diagnostics, Anti-Virus, and a license for Lotus SmartSuite. (SmartSuite is not preloaded; you must return the license to receive the SmartSuite CD or, for around $40 more, the floppy disks and manuals.)

IBM considers the Model 3 the first of its NT workstation–class systems, and plans to add more such systems to the PC 365 series in the first half of 1997.

—*Shane Rau* ▶

IBM PC 365

PRO: Dual-processor capability, smart hard drives.

CON: Costs extra to access some of the best technologies.

VALUE: At first glance, good.

List price: Starting at $2400

IBM Personal Computer Company

800/426-4968

http://www.pc.ibm.com

QUICK TAKES

HP's Small-Biz PCs

Hewlett-Packard's updated Vectra 500 PC line offers units intended for businesses with one to 100 workers. The Vectras sport 133-, 166-, and 200-MHz Pentium processors; 1.2GB to 2.5GB hard drives; and 12MB to 32MB of RAM. Some have 8X CD-ROM drives and Matrox Millennium graphics cards; all have sound cards, 28.8-kbps modems with e-mail, fax, and voice-mail. Windows 95, Microsoft Word, Netscape Navigator, Internet Explorer, Intel ProShare, and DataSafe backup software come standard. Top-of-the-line units include Microsoft Office Professional and Microsoft Publisher. The 13 PC configurations have street prices of $1270 to $2876, not including monitor. Hewlett-Packard, 800/752-0900, http://www.hp.com.

READER SERVICE NO. 769

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Hz Pentium® Processor, 32 MB EDO RAM,
3 Pipeline Burst Cache, 3.2 GB E-IDE HD,
-IDE CD-ROM Drive, 17" Color Monitor,
II Low Radiation, 0.28mm DP ..... **$ 2595**

Infinity PT6-A200

Hz Pentium® Pro Processor, Based on
PCIset, 256 KB Internal Cache,
3 Burst EDO RAM, 3.2 GB E-IDE HD,
-IDE CD-ROM Drive, 17" Color Monitor,
II Low Radiation, 0.28mm DP,
ws NT Workstation Pre-Installed, with CD ..... **$ 3095**
12 KB Internal L2 Cache ..... **$ 3695**

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MB EDO RAM Upgrade ..... **call**
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«The CLR Infinity delivers. Top-flight performance at a good price.»
PC Magazine, January 23, 1996

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BEST BUY AWARD
COMPUTER BUYER'S GUIDE AND HANDBOOK
June 1996

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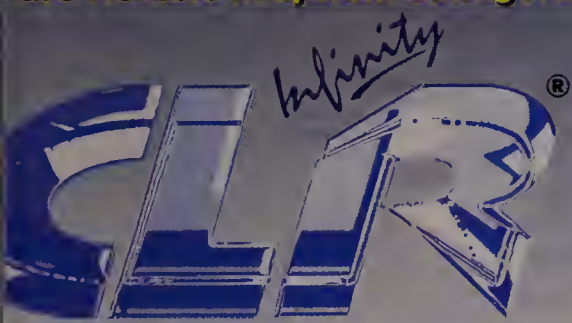
October 1996



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Circle 53 on reader service card

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Circle 245 on reader service card

Oil Change Automates Your PC Maintenance

UTILITY

I LIVE WITH the uneasy reality that my PC is a perpetual work in progress. Vendors continually release software updates, bug patches, and hardware driver revisions. Finding these bits of software and installing them is time-consuming and frustrating. But **Oil Change**, a Windows 95 utility, scans your PC for common software and hardware, then uses the Internet to automatically download and install any updates.

The prerelease version of Oil Change I tested was difficult to install, and some features weren't working yet. The program ignored my SCSI and network cards, but did find that my Sound Blaster card needed a driver update. Oil Change automatically connected to the Creative Labs FTP site, pulled down the update, and installed it on my PC. If things go wrong, you just use the undo feature to return things to the way they were before.

CyberMedia supports products from many big software and hardware firms, including Corel, Creative Labs, Hewlett-Packard, Microsoft, Netscape, Novell, and U.S. Robotics. The beta-version Oil Change recognized some 600 products; about 400 more should be on board when you read this. At a street price of $40, Oil Change qualifies as an almost-essential utility. Two drawbacks: You will have to put up with online ads while connected, and realize that CyberMedia keeps track of your PC configuration.

—*Stan Miastkowski*

KEEP IT CURRENT: Oil Change automates the formerly pain-filled process of updating your computer's software.

Oil Change

PRO: Painless, automatic software upgrades.
CON: Won't recognize all products.
VALUE: Well worth the money.
CyberMedia, Inc.
800/721-7824
http://www.cybermedia.com
Street price: $40
READER SERVICE NO. 770

Pocket-Size PC Tape Recorder

RECORDER

COMPACT TAPE recorders are handy for recording memos and notes on the fly. But without a link to the computer, they have been of limited usefulness, particularly if you want to share your recorded thoughts with other people. Now NCI offers a solution: Its **Flashback Mobile Office** package includes a handheld Voice Recorder, interchangeable SoundClips, and a Flashback VoiceLink PC Card. I tested a shipping version.

The palm-size recorder captures remarkably clear voice messages onto removable 18- or 36-minute SoundClips—thin cartridges that snap into the end of the VoiceLink PC Card. Once you get used to the device's arcane message editing system, you can insert thoughts or edit out words and sentences. To transfer messages to your PC, pull the SoundClip from the recorder, insert it into the PC Card, and insert the PC Card into the Type II slot on your notebook. The VoiceLink software (it's on a single floppy) can convert recordings into .wav files. It also allows voice editing.

The VoiceLink PC Card comes with a microphone and earphone jack for recording directly into your PC's hard drive, at a rate of 18 minutes per megabyte.

—*Michael S. Lasky*

Flashback Mobile Office

PRO: Easy transfer of voice memos to your computer.
CON: Somewhat arcane editing controls.
VALUE: Good way to share voice memos with others.
NCI
800/916-6267
http://www.norriscomm.com
List price: $549.95 or $599.95 with 18 or 36MB SoundClip
READER SERVICE NO. 771

QUICK TAKES

Financial Manager

If you run a small or home business and want to get inside your financial numbers, Microsoft's **Small Business Financial Manager** add-on for Excel 95 can help. (Excel for Windows 95 must be installed.) The Manager includes an Import Wizard that lets you easily bring in data from your accounting software: It supports many top accounting packages such as Great Plains and Peachtree. The Reporting Wizard lets you create reports that you can dig down into for more detail—helpful when dealing with audits or reviews. For planning, the Manager has a What-If Wizard that shows you various scenarios, including break-even analysis and buy-versus-lease comparisons. At a $100 street price, this add-on will pay dividends fast. Microsoft, 206/882-8080.
READER SERVICE NO. 772

Macro Virus Protection

When Word viruses began to appear in the summer of 1995, Microsoft quickly came up with a patch—a macro to guard against the unwanted macros that can hide in documents. Now Look Software Systems has introduced **Virus Alert for Macros.** Street-priced at $30 the package integrates into Word versions 6 and 7, scanning when you start a new document or open an old one. If it detects an unfamiliar macro, you choose to remove or not (to help prevent deletion of legitimate Word macros). Virus Alert also offers free updates online. Look Software Systems, 800/678-5511.
READER SERVICE NO. 773

For more information about a product, contact the manufacturer or circle the number on the reader service card. ■

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The fact is, exclusive NEC MagicEye™ technology monitors the function and operation of each PowerMate system, including its hard drive activity, temperature and voltage. It'll even alert you if a computer is tampered with. If a problem is detected, Intel's LANDesk® Client Manager 3.0 lets you remotely access the system for efficient, centralized management. What's more, Cybermedia's FirstAid 95 Deluxe automatically fixes configuration errors and, along with McAfee's anti-virus software, protects your valuable data.

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Granted, you may still have to put out an occasional fire. But at least now you can do it in everyday business attire. For more information, call 1-800-NEC-INFO, or visit us on the web at http://www.nec.com.

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Circle 180 on reader service card

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Feb. 1996 6Ne

PC World Best Buy
May 1996 20GLs

Windows Magazine Recommended
June 1996 17GLsi

energy
Partner of the Year 1996

PC World Best Buy
July 1996 17GLi

Windows Magazine 100 1996
Summer 1996 17GLsi

PC Computing The A List
July 1996 17GLsi

Windows Magazine Recommended
Aug. 1996 21GLs

PC Computing Best
Aug. 1996 17GLsi

Imaging Editors' Choice
Aug. 1996 21GLs

1996 VAR Business Product Report Winner
1996 VAR Business Product Award Winner 17" monitors

BEST PC CD-ROMs

114 GAMES Quake, Rattle, and Roll

116 TRAVEL Here and There

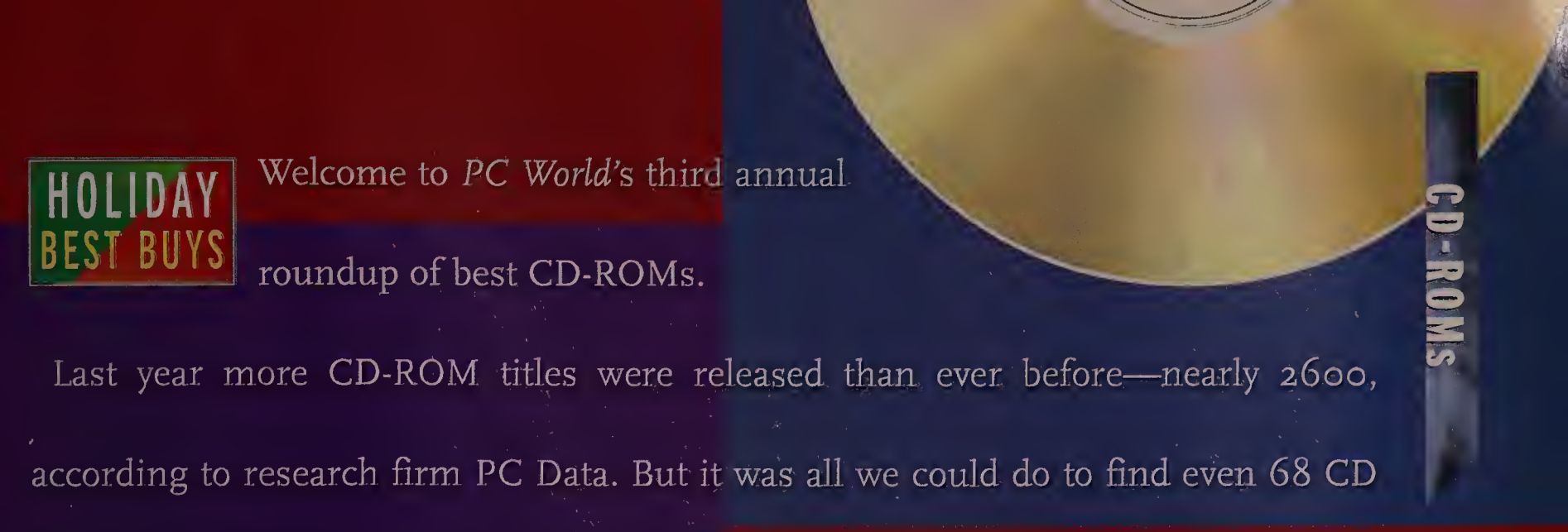
117 REFERENCE All the Answers

123 ART & CULTURE Cool, Man

124 HISTORY & SCIENCE Back to the Future

127 POTPOURRI Health, Hearth, and Hops

128 KIDS CORNER Green Eggs and Barbie



HOLIDAY BEST BUYS

Welcome to *PC World*'s third annual roundup of best CD-ROMs.

Last year more CD-ROM titles were released than ever before—nearly 2600, according to research firm PC Data. But it was all we could do to find even 68 CD titles you'd be happy to get in your holiday stocking.

Maybe we've become blasé. When we did our first CD-ROM roundup two years ago, we found so many worthy titles there wasn't enough space to include them all. Last year, we easily rounded up 75 top-notch discs. This time, many of the titles we auditioned had fascinating content saddled with confusing interfaces, or easily accessible material that was déjà vu derivative. Been there, clicked that.

And while Windows 95 helped ▶

OF 1996

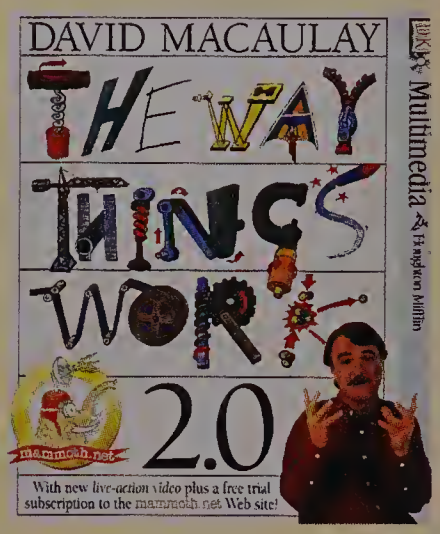
EDITED BY MICHAEL S. LASKY

PC WORLD'S

DISC *of the* YEAR

THE WAY THINGS WORK 2.0

HOW DOES THE BEST multimedia work? Like this. The original The Way Things Work was the brightest, most inventive, most technically masterful title we'd seen, engaging kids and adults alike. Version 2.0 works even better, with



delightful new material about machines, inventors, science, and technology, all presented with theatrical panache. This time around, author David Macaulay joins the previous host, the animated Woolly Mammoth, on a wide-eyed, mouse-clicking tour of the enchanting inventions warehouse. Each room is filled with whimsical illustrated devices (from a lightbulb to a laser, a TV to a vacuum cleaner) that animate when you click them. Many multimedia discs contain as much content as this one, but they make the user hunt for it. Here you can easily search by wandering through the warehouse, or you can use the A to Z index to go straight to the invention you want. A Web link takes you to Mammoth.net to collect up-to-date information, downloadable goodies, a mailbox where you can exchange e-mail with other invention buffs, and much more. The only thing you never learn is how Macaulay's hair works: In every scene it just lies across his forehead and never moves. They probably saved that explanation for version 3.0.

—*Michael S. Lasky*

DK Multimedia, $39.95, 800/356-6575, http://www.dk.com

READER SERVICE NO. 774

reduce many irksome technical glitches, most discs continue to crash your system, trash your hard disk with ponderous files, or bash you with boring content. Still, don't count out multimedia titles just yet. Why? There are two reasons:

• Many CD-ROMs now offer links to the Internet, so you can add up-to-the-minute information or battle opponents around the world. By delivering the interface and graphics software on disc, these Web-savvy CD-ROMs let you experience the multimedia potential of the Internet without endless waits for downloads. We've used an online icon to indicate the titles that offer an online connection.

• The Digital Versatile Disc (DVD-ROM) is coming—or so we're told. This 4.7-inch platter will hold up to 25 times more data than today's CD-ROMs. Imagine an entire national phone directory on one disc, or a game with hours instead of minutes of video. At press time only one DVD-ROM title was available: Digital Directory Assistance's $99 PhoneDisc PowerFinder USA One, with 112 million white- and yellow-page phone and address listings in the U.S. (Read more about DVD in "DVD: CD-ROMs on Steroids.")

The good news is that the 68 titles listed here are truly state of the art, with content engaging enough for repeated play, and programming savvy enough to run smoothly on a wide range of systems.

See "The A List" for a summary of CD-ROMs that received an A– or better grade in *PC World* from December 1995 to November 1996. Of course, a title is useless if your drive can't run it smoothly. So we've included handy tips to keep your discs spinning.

For balance, we offer "*PC World*'s Bottom Ten List," a compendium of ten loathsome, tasteless, and/or stupid titles that will run oinking to you if you yell "sooey!"

GAMES Quake, Rattle, and Roll

By Steve Klett

AH-64D LONGBOW

JANE'S COMBAT SIMULATIONS puts the grace and raw power of one of the world's most awesome machines of destruction—the AH-64D Longbow attack helicopter—on your desktop. Simply put, this is one of the most realistic, encompassing flight sims available. Its silicon controls are modeled on those of its real-life counterpart, with extreme attention to detail. Longbow's impressive cinematic sequences and textured terrain are precisely rendered. As you'd expect, however, this game is a horsepower hog: Don't even attempt to fly it with anything less powerful than a Pentium-90 and 16MB of RAM.

AH-64D Longbow one-ups flight sims with realistic controls and high-textured terrain.

Electronic Arts/Origin Systems, $59.99, 800/245-4525, http://www.origin.ea.com

READER SERVICE NO. 775

CIVILIZATION II

THE OPEN-ENDED NATURE of Sid Meier's Civilization captured the hearts, minds, and wallets of strategy gamers everywhere. Civilization II not only fixes the faults of its predecessor, but brings improved computer-opponent artificial intelligence to the table, as well as some nicely updated Super-VGA graphics and an extensive help system. Civ II is a turn-based game of exploration and conquest. You settle each virtual land mass as you explore it, fighting when you must and establishing truces when you can. Scrolling graphics offer multiple-

TIP

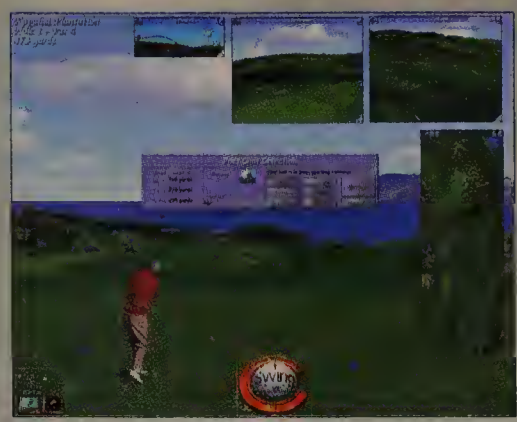
WALK, DON'T AUTORUN

If you don't want a CD-ROM to start up automatically with Windows 95's autorun feature, press the <Shift> key as the CD-ROM drive door closes and hold it down for a second or two after.

angle views of each realm you enter. Think the real world was once a simpler place? Try carving out a niche in this digital civilization. This is one complex and sophisticated game of global conquest.

Microprose, $49, 800/695-4263, http://www.microprose.com

READER SERVICE NO. 776



With its multiple viewpoints and realistic play, Links LS is a virtual hole in one game.

CLOSE COMBAT

THIS WORLD WAR II squad-level combat sim is at the head of its class, er, squadron. Close Combat recreates the first six weeks of the Allied invasion of Normandy. Each battle is based on actual WWII engagements—you fight as either the Germans or the Americans—and the game makes excellent use of archival film footage and still photos to enhance the realism. Sophisticated artificial intelligence gives your troops amazingly realistic personas: They react to combat stress and may even flee or refuse to obey your orders. And the real-time nature of the game means there's no pause between turns that would let you collect your/their wits.

Microsoft, $44.95, 800/426-9400, http://www.microsoft.com

READER SERVICE NO. 777

LINKS LS

SURPRISINGLY, GOLF GAMES seem to push the limits of computer technology more than any other genre. And no golf game succeeds at getting you onto the green like Access's three-disc Links LS. Desktop duffers will marvel over Links LS's exquisite renderings of the Plantation and Village courses at Kapalua, Hawaii, and Arnold Palmer's home course at Latrobe, Pennsylvania. You see the entire golf course—not just the hole—for a truly realistic golfing experience. You play with Palmer and three anonymous players; and their motion-captured movements and reactions to shots are lifelike and believable. Palmer volunteers general advice as you go along.

Access Software, $49, 800/800-4880, http://www.accesssoftware.com

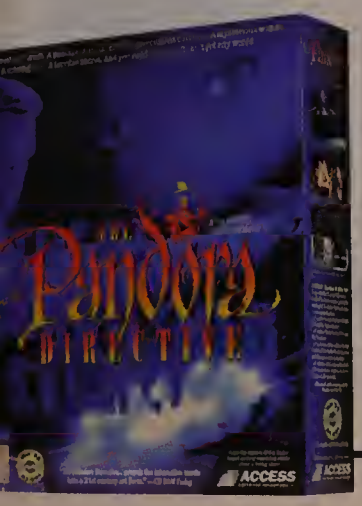
READER SERVICE NO. 778

THE PANDORA DIRECTIVE

UNDER A KILLING MOON'S multiple-CD format, detailed story, compelling video characters, and fluid graphics broke new ground when it debuted two years ago. Now, its six-disc sequel—The Pandora Directive—ups the ante with improved graphics, better acting, and a bigger, better mystery to solve. You must help the bumbling yet charismatic P.I. Tex Murphy uncover a government conspiracy in a postapocalyptic San Francisco. It's Sam Spade in the 21st century. You are plunged into a first-person, 3-D gaming world that lets you explore every room's nook and cranny. Cinematic production values and professional talent such as Barry Corbin (*Northern Exposure*) help make the game look and feel like a movie, but you're the star.

Access Software, $39.95, 800/800-4880, http://www.accesssoftware.com

READER SERVICE NO. 779



QUAKE

FIRST-PERSON action (read: shoot-'em-up) games will never be the same. Quake—id Software's successor to its megahits Doom and Doom II—actually lives up to its unbelievable hype. So how do you out-Doom Doom? With detailed, scrolling 3-D technology not previously seen in PC gaming. You tear around hallways and blast various demonic baddies. Its 3-D environment all but sucks you into the screen: Catwalks, bridges, rooms above rooms, and even the enemy crea-

PC WORLD'S

BOTTOM TEN LIST

CD-ROMS

10 Who Do You Think You Are? The Berkeley Personality Profile

Look, Ma, it's Instant Shrink in a Box! But, hey, if you really want The Answer, you might as well call the Psychic Friends Network. They *know* who you are. **HarperCollins Interactive.**

9 Cory Everson: Mind, Body, and Soul

We'd call it "Cory Everson: Empty Mind, Buffed Body, and Soul to Go." The six-time Miss Olympia wants to pump you up, but her disc is filled with mindless tidbits about staying motivated. We've learned more from the nutrition panels on Fritos bags. **Philips Media/Primal Media Corp.**

8 Microsoft Monster Truck Madness

They got the monster part right: Optimum performance requires 100MB of data copied to your hard drive—and that means this behemoth is larger than Win 95 itself! Get real: It's only a *game*, stupid. **Microsoft.**

7 Catfight: The Ultimate Female Fighting Game

Thong-adorned warriorettes with names like Thermia, Chae Lee, Phantasma, and Jennifer—*Jennifer?*—claw it out in this transparently sexist concept, and the result is a scratch. **Atlantean Interactive Games.**

6 The Baywatch Companion With Screensaver

Help, help, I'm drowning. More than five dozen clips from the infamous syndicated surf 'n' sand soap repeat on your computer screen until you confess to every unsolved crime com- ▶

mitted in Los Angeles in the last year. **Byron Preiss Multimedia.**

5 Don't Quit Your Day Job: A Ruthless Comedy Game

No-talent (take my wife, pleeze!) stand-up comics vie to get a gig on a late-night talk show, but the humor is stale and in-your-face obnoxious. The computer geeks who designed this would have been better off taking their own advice. **Philips.**

4 Alleycats: The Strip Bowling Game for Fast Lane Players

Strip poker, yes. But strip bowling? Spare us. Just the idea of a computer bowling simulation strikes out. This is a gutter ball from the get-go. **Atlantean.**

3 Voyeur II

As if part one were not enough, this sequel drags actors Jennifer O'Neill and Dennis Weaver into a stilted click-and-hunt murder mystery where the main question is, Who *cares* who dunnit? **Philips.**

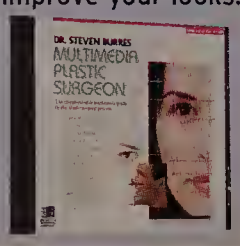
2 SuperModels in the Rainforest

An Enhanced CD plants fulsome women sheathed in scanty swimwear in the Amazon rainforest to create a multimedia environmental message festooned with flora, fauna, and flesh. This disc gives new meaning to the term "unclear on the concept." **Highway One.**

1 Multimedia Plastic Surgeon

We are not making this up. Beverly Hills plastic surgeon Dr. Steven Burres shows you how surgery can improve your looks. Next in the series: Do-It-Yourself Home Lobotomy. **Brentwood.**

—*Michael S. Lasky*



tures are 3-D. Add a haunting soundtrack by Nine Inch Nails' Trent Reznor and graphics resolutions of up to 1280 by 1024, and you have the most downright creepy game ever made. Quake is extremely gory and may not be suitable for younger players. It is also extremely addictive.

GT Interactive/id Software, $45, 800/332-4300, http://www.idsoftware.com

READER SERVICE NO. 780

TOONSTRUCK

DON'T LET THE NAME deceive you: Toonstruck's juvenile title belies twisted content definitely aimed at adults. Toonstruck casts you as animator Drew Blanc (played on screen by Christopher Lloyd) who gets sucked into the world of Toons. To get home, you must wander through brilliantly animated worlds filled with puzzles and twisted characters like Spike the Clown and Warp and Woof (parodies of *The Simpsons'* Itchy and Scratchy). The technology that puts Lloyd in the toon world is leading-edge. The game virtually screams with high production values.

Toonstruck's zany characters may fool you: Its wit is not just for kids.

Virgin Interactive Entertainment, $59, 800/874-4607, http://www.vie.com

READER SERVICE NO. 781

TIP

DON'T SET ME UP

Want to audition a title before you install it on your hard drive? Use Windows Explorer or Winfile to find the program's main .exe file. This usually approximates the title of the disc—for example, the file for Mixman (in the Art & Culture section) is Mixman.exe. With most CD-ROMs, you double-click the file name to launch it from the disc.

ZORK NEMESIS

THE FIRST ZORK GAMES were text-based, so the graphics were all in your mind. Now, in the nineties, the graphics are on your screen—with a vengeance! Nemesis lacks the odd humor in earlier Zork installments but it has an involving story and mind-bending puzzles. It also boasts a fluid, first-person environment and almost unparalleled visuals. Nemesis allows 360-degree panning as you explore: Move the mouse left or right and you rotate, smoothly taking in the world around you. While the puzzles are tough, a built-in help system gets you over the hurdles.

Activision, $49.95, 800/477-3650, http://www.activision.com

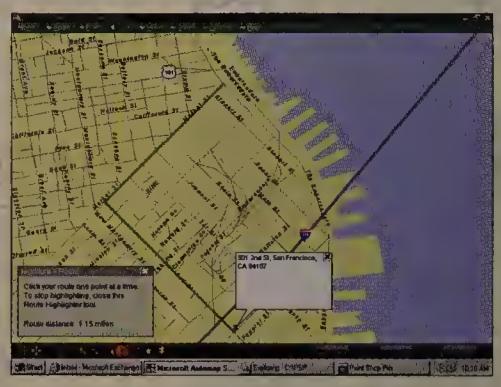
READER SERVICE NO. 782

TRAVEL Here and There

By James Martin

AAA MAP'N'GO 2.0

WHAT AAA MAP'N'GO LACKS in multimedia pizzazz, it makes up in the automapping department. Map'n'Go features colorful, detailed maps and a refreshingly straightforward interface. And the AAA destination database—with essays on history, walking tours, and other information—provides depth. Map'n'Go also has Internet links so you can get the latest road conditions for your trip. Unlike other programs, Map'n'Go includes an on-screen log of your actions, so you don't need a trail of bread crumbs to avoid getting lost in the program. Even more reassuring is its support of Global Positioning System devices. With a GPS device and a multimedia laptop, Map'n'Go can pinpoint your location and show you exactly where



The addition of the AAA destination guides to custom maps makes this a Go.

you are on a map at any given moment.

DeLorme Mapping, $39, 800/452-5931, http://www.delorme.com

READER SERVICE NO. 783

FROMMER'S INTERACTIVE TRAVEL GUIDES

AMONG THE NUMEROUS paperback travel guides, Frommer's are consistently top-notch. Now, with interactive CD-ROMs on Boston, New Orleans, New York, and San Francisco, the Frommer's formula appears in a multimedia format. Each disc's attractive, easy-to-follow interface lets you jump quickly from one topic to another. Also included are high-quality color photos and large-format QuickTime videos. Nice touches: You can easily build a travel plan as you go, and you can use a robust filtering mechanism to sniff out hotels, restaurants, nightclubs, and shops that fit your needs.

Macmillan Digital U.S.A., each $30 street, 800/919-0099, 212/654-8500, http://www.macdigital.com

READER SERVICE NO. 784

TRIPMAKER 1997 EDITION

YOUR DAYS OF ASKING a gas station attendant for directions are numbered, thanks to Rand McNally's TripMaker, which has more features and engaging multimedia content than its competitors. You can create detailed point-to-point North American road itineraries with TripMaker and enjoy panoramic photos, video clips, and practical information on cities. The 1997 edition adds links to the Web's best travel sites, detailed camping information on 1700 parks and forests, and interactive park maps.

Rand McNally New Media, $40 street, 800/671-5006, http://www.randmcnally.com

READER SERVICE NO. 785

REFERENCE All the Answers

By Dennis O'Reilly

1997 GROLIER MULTIMEDIA ENCYCLOPEDIA

ENCYCLOPEDIAS ON CD-ROM were among the first products to show the potential of multimedia for information delivery, and the category is again leading the way in tying disc-based information to online resources. The 1997 Grolier Multimedia Encyclopedia adds links to Web sites that provide more information on subjects. It took less than 5 minutes to move from an essay on Anne Frank to another on the Holocaust, and then on to the U.S. Holocaust Memorial Museum Web site. Grolier's Knowledge Tree is an easier way to browse categories than keyword searching, and its outlines make finding specific information in long essays a snap.

Grolier Interactive, $59.95, 800/285-4534, http://www.grolier.com

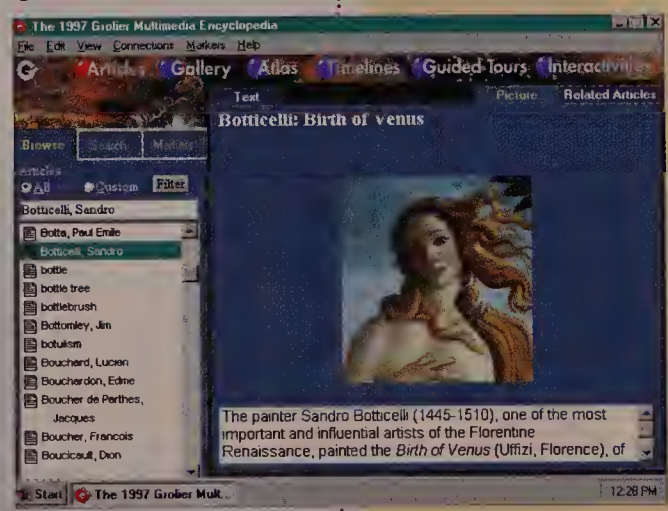
READER SERVICE NO. 786

COMPLETE BIBLE AND REFERENCE GUIDE

THERE'S NOTHING new about converting books to CD-ROM, but often the task is done with little creativity. Corel used imagination for its Complete Bible and Reference Guide: Text appears on scrolled parchment; heavenly clouds serve as a backdrop to the category buttons. The King James text is enhanced with Barron's Notes, and users can jot down their own notes and bookmarks. The notes link to Bible verses, as do timelines for both Old and New Testaments. Other features include sound and picture tours, maps, and biblical paintings.

Corel Corp., $21.99, 800/772-6735, http://www.corel.com

READER SERVICE NO. 787



Quick Web site links and detailed essays make Grolier's a resourceful CD-ROM reference tool.

TIP

GET ME OUTTA HERE!

Can't find the key combination to quit a CD-ROM program? Remember, you can quit any program in Windows 3.x and Windows 95 by pressing <Alt>-<F4>.

THE A LIST

THERE ARE CD-ROM TITLES galore these days, and we've reviewed stacks of them in the last 12 issues of *PC World*. Here's a snapshot of all the titles that ranked A– or higher from December 1995 to November 1996. For more detail, refer to the issue indicated.

THE 11TH HOUR

WORK YOUR WAY through brainteasers and 65 minutes of live video as you explore a haunted mansion to save a damsel in distress. Trilobyte Inc., $70, 800/814-3530, http://www.trilobyte.com

READER SERVICE NO. 812

(March 1996)

A TO ZAP

CLICK ON ONE of the 26 letter blocks, and—presto—you've got a game to help your 3- to 6-year-old child learn alphabet basics. Sunburst Communications, $29.95, 800/786-3155, http://www.nysunburst.com

READER SERVICE NO. 813

(June 1996)

A.D.A.M. THE INSIDE STORY

THIS DISC IS PACKED with humor and lifelike illustrations that enable you to explore the human body's 12 physiological systems. Check out the skull, heart, and lungs through stunning 3-D models. A.D.A.M. Software, $39.95, 800/955-9920, http://www.adam.com

READER SERVICE NO. 814

(November 1996)

BAD MOJO

POOR ROGER has turned into a cockroach. Help restore him to human form by solving puzzles found around his apartment building. Pulse Entertainment, $54.95, 800/264-0325, http://www.badmojo.com

READER SERVICE NO. 815

(June 1996)

BATTLE BEAST

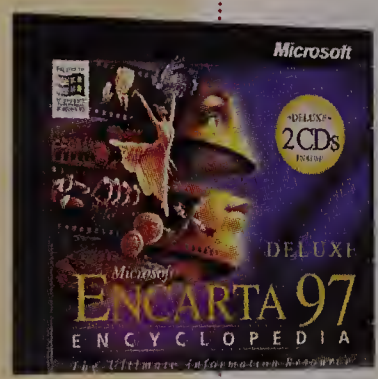
CHOOSE YOUR OWN weapons to fight in this intense but not-as-violent-as-you-might-think confrontation between gigantic killer robots. Great animation. 7th Level, $49.95, 800/884-8863, http://www.7thlevel.com

READER SERVICE NO. 816

(December 1995)

BETTER HOMES AND GARDENS 101 WEEKEND PROJECTS

FROM LAMPSHADE painting to garden shed construction, you have all the instructions you need to tackle projects indoors and out. Philips Media, $39.95 ($45.95 for CD-ROM with book bundle), 800/850-7272, http://www.philips.com



READER SERVICE NO. 817

(September 1996)

CAPITALISM

GREED IS GOOD: Push your business acumen to the limit as the president of a virtual company that trashes its competitors as you claw your way to the top. Interactive Magic, $59.95, 800/789-1534, http://www.imagicgames.com

READER SERVICE NO. 818

(March 1996)

CONSUMER REPORTS CARS: THE ESSENTIAL GUIDE

ARM YOURSELF with automotive lingo, advice, and careful evaluations of 7300 cars to get the one-up on those pushy salespeople. Creative Multimedia, $19.99, 800/755-2670, http://www.creativemedia.com

READER SERVICE NO. 819

(May 1996)

EYEWITNESS VIRTUAL REALITY CAT

TAKE A STROLL through a virtual cat museum. Visitors roam at will through a rotunda whose walls are constructed of displays on every imaginable aspect of the cat family. Gentle purrs and ferocious roars greet you as you enter the museum, but these exhibits are made for touching, albeit with mouse clicks. Click on an illustration and you enter the realm of that particular feline: You learn about the history, biology, and mythology of each.

DK Multimedia, $29.99, 800/356-6575, http://www.dk.com

READER SERVICE NO. 788

Big roar: DK Multimedia's Virtual Reality Cat practically jumps out of your monitor.

TIP

CLEAN UNINSTALLS

Most multimedia programs now include an uninstall option. In Windows 95, you'll find it in the Add/Remove Programs folder in Control Panel or directly in the program desktop folder added during installation. Check both places before deleting the program's directory manually in Explorer, Winfile, or DOS. Deleting a program manually can leave orphan files in other directories.

MICROSOFT ENCARTA 97 WORLD ATLAS

SPORTING EXCELLENT LINKS to the Internet, Microsoft's 97 edition of its world atlas shines in its capabilities to keep the data current. Suppose you want information on Barcelona, Spain. Position a map pin on the multidimensional globe, click on the Web connector, and you're off to a special Microsoft Web page with dozens of links for that city. The crisp, high-resolution maps blend smoothly with the text, audio, and video. With Encarta, you've got the whole world in your PC.

Microsoft, $59, 800/426-9400, http://www.microsoft.com

READER SERVICE NO. 789

MICROSOFT CINEMANIA 97

YOU MAY THINK YOU KNOW movie trivia, but a few minutes with Cinemania 97 will convince you that much remains to be discovered about the world's favorite pastime. The latest version opens with a revitalized contents screen providing a daily trivia question, biographies of featured artists, and video celebrity tours hosted by Roger Ebert, Leonard Maltin, and others. And now the disc has caught Web fever, too. Almost every screen entices you with links to Cinemania Online for additional biographies, articles, and links to other movie Web sites. Cinemania 97 is almost as much fun as a night at the movies.

Microsoft, $34.95, 800/426-9400, http://www.microsoft.com

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NOT TOO LONG AGO, our dens became our home offices. But that home-office machine isn't earning its keep if it's not running Home Office Assistant. Business advice, statistics, legal aid, personnel tips, a directory of toll-free numbers, and market research are a mouse-click away. Online business-supply catalogs and shipping/delivery links elevate this disc from useful to indispensable for small- and home-office users.

Mindscape $35, 888/808-4311, http://www.mindscape.com

READER SERVICE NO. 791

MICROSOFT ENCARTA 97 ENCYCLOPEDIA DELUXE EDITION

THEY'VE BEEN CALLED every name in the book, but the folks in Redmond do make some fine software. The latest edition of Microsoft's frontline encyclopedia adds collages and 360-degree views, plus Web links and monthly yearbook updates from the company's Web site. Moving from the disc to the Web proceeds ▶

The Vision

THE SKY IS THE LIMIT

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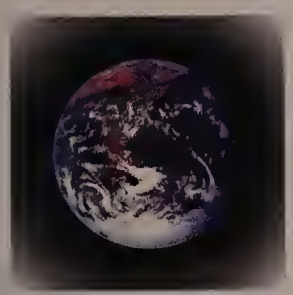

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Lithium-Ion Battery
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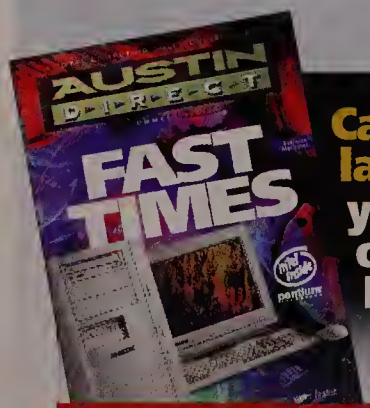

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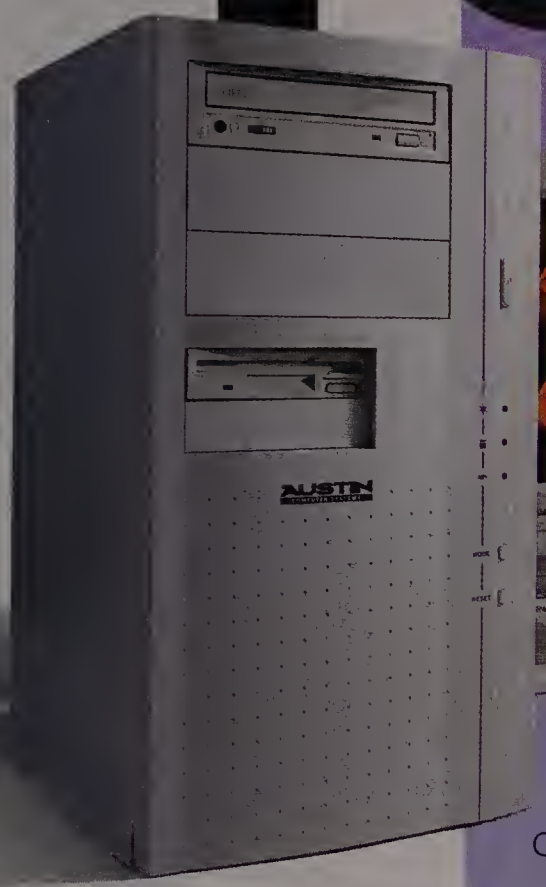

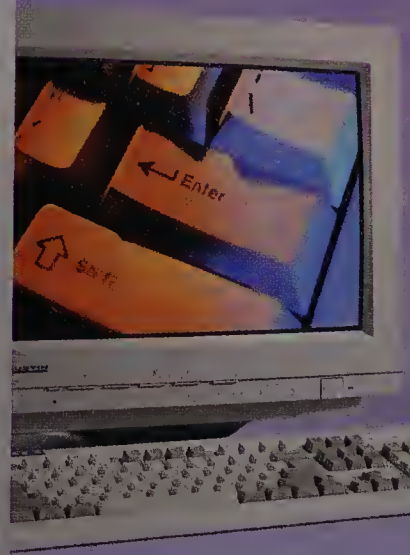

intel inside pentium PROCESSOR

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200 MHz Intel Pentium Pro Processor with integrated 256K L2 Cache
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TIP

SLIPPED DISCS 1

If your drive can't read the CD-ROM you inserted, the disc may be dirty. Clean it with a soft cloth or lightly moistened paper towel, using linear strokes from the center out. Never rub in a circular motion, or the dirt particles might scratch the disc.

so transparently that you may not be sure at times whether you're looking at the disc or a Web site. On the disc, the Find Wizard and various filters in the Pinpointer make searches a breeze. Essays lack the detail and clarity of those in competing CD-ROM encyclopedias, but the multimedia implementation and online links make Encarta one to watch.

Microsoft, $59, 800/426-9400, http://www.microsoft.com

READER SERVICE NO. 792

ART & CULTURE ·Cool, Man

By Steve Anzovin

THE BEAT EXPERIENCE

BASED ON MATERIAL from the Whitney Museum's recent show "Beat Culture and the New America 1950–1965," this disc is a largely successful attempt to exhume the Beat Generation of the late fifties and sixties. It's a loosely structured collage of alternative film, still art, spoken poetry, and jazz. And loose is apropos: This is Beat, man. Listen to Burroughs; jive to Coltrane; hit the road and see fifties America. The Beat Experience evokes the times powerfully, engagingly, and entertainingly.

Voyager, $39.95, 800/446-2001, http://www.voyagerco.com

READER SERVICE NO. 793

ESCHER INTERACTIVE: EXPLORING THE ART OF THE INFINITE

THE MIND-BENDING WORK of M.C. Escher inspires one of the few truly interactive art discs. Escher Interactive contains an extensive sampling of Escher's art plus audio and video of Escher and others, explaining his artistic development. But clever interactivities provide the real insight: a game wreaks havoc with your sense of space and gravity; and some wonderfully tough 3-D puzzles ask you to reconstruct the frameworks for his impossible structures.

Harry N. Abrams/Byron Preiss Multimedia, $55, 800/288-2131, http://byronpreiss.com

READER SERVICE NO. 794

PAUL CÉZANNE: PORTRAIT OF MY WORLD

HISTORIANS CONSIDER painter Paul Cézanne the precursor of Cubism, and thus of twentieth-century abstract art. What's hard to discern from Cézanne's emotionally cool paintings are his passions; but this informative disc makes them clear. As you tour his studio, you appreciate his struggle to gain acceptance for his revolutionary vision. Investigations of 15 paintings magnify the works—you can scroll inch by inch over canvases.

Corbis, $49.95, 800/246-2065, http://www.corbis.com

READER SERVICE NO. 795

SACRED AND SECULAR: THE AERIAL PHOTOGRAPHY OF MARILYN BRIDGES

THESE STUNNING BLACK-AND-WHITE photographs, taken from a small plane flying at low altitude, present a god's-eye view of the earth's human and natural landscapes. Marilyn Bridges' sharp eye brings us the sacred (Egyptian pyramids, majestic Alaskan landscapes) and the secular (farms, highways). A near-perfect interface is user-responsive, cleanly designed, and instantly understandable. There's also audio commentary for every shot and even a few survival tips for hanging out of low-flying planes.

Voyager, $39.95, 800/446-2001, http://www.voyagerco.com

READER SERVICE NO. 796

COOKING WITH DOM DELUISE

MANGIA! Dom Deluise is hungry and he's in the kitchen. Whet your palate with over 200 of his recipes (mostly Italian, of course), and follow his steps with video and audio clips. Allegro New Media, $49.95, 800/424-1992, http://www.allegrom.com

READER SERVICE NO. 820

(February 1996)

ELROY HITS THE PAVEMENT

RESCUE ELROY'S DOG Blue from the clutches of nasty thugs in this interactive mystery adventure for kids, which features a plot that twists at every turn. Headbone Interactive, $30, 800/267-4709, http://www.headbone.com

READER SERVICE NO. 821

(August 1996)

HUMAN DYNAMICS: THE ULTIMATE VOYAGE

FREE OF PSYCHOBABBLE, this disc offers insights and explanations of how four distinct personality types interact. Edudare, $49.95, 800/779-4504, http://www.edudare.com

READER SERVICE NO. 822

(April 1996)

INFINITY CITY

HERE ARE 50 AMUSING WAYS for children age 4 to 8 to practice their early math skills in real-life situations, from telling the time to performing creative antics in the grocery store. Headbone Interactive, $29.95, 800/267-4709, http://www.headbone.com

READER SERVICE NO. 823

(November 1996)

LANDDESIGNER 3D

GET YOUR HANDS DIRTY planning a dream garden from start to finish, taking the opportunity to walk through a virtual 3-D rendition before placing your nursery order from the included catalog. Sierra Online, $39.95, 800/757-7707, http://www.sierra.com

READER SERVICE NO. 824

(July 1996)

LOGICAL JOURNEY OF THE ZOOMBINIS

KIDS 8 TO 12 guide the wandering Zoombinis to their new homeland by solving entertaining puzzles at various levels of sophistication. Broderbund Software, $40, 800/521-6263, http://www.broderbund.com

READER SERVICE NO. 825

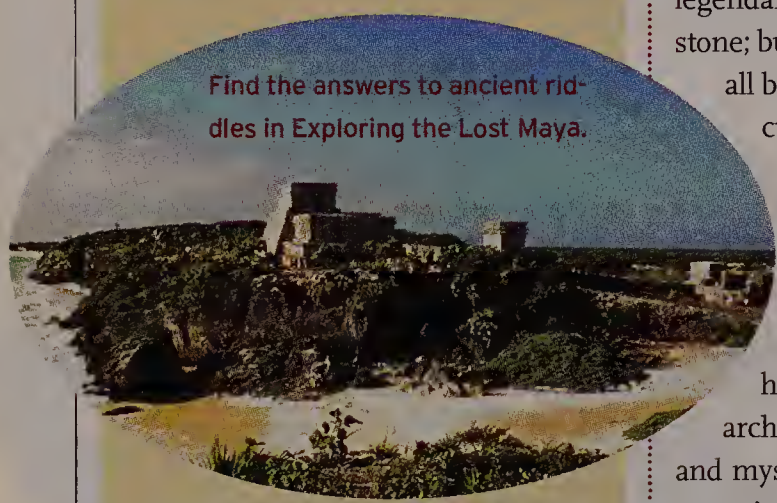
(July 1996)

MARTY AND THE TROUBLE WITH CHEESE

USE A MICROPHONE instead of a mouse or keyboard to help rodent Marty in his quest for a hunk of cheese in this game for kids ages 2 to 4. Maxis, $29.95, 800/526-2947, http://www.maxis.com

READER SERVICE NO. 826

(April 1996)



Find the answers to ancient riddles in Exploring the Lost Maya.

MONOPOLY CD-ROM GAME

THE CLASSIC board game comes to life in video and sound. Challenge players around the globe via a linked Web site. Parker Brothers, $49.99, 800/ 874-4607, http://www.monopoly.com

READER SERVICE NO. 827

(December 1995)

TIP

SLIPPED DISCS 2

If your drive can't read the CD-ROM you inserted, the disc may be an Enhanced CD (where music and data forms reside on the disc) that your system does not have the correct drivers to read properly. If the music portion plays on your audio CD player, you'll need to get Enhanced CD drivers from Microsoft.

ROBERT MAPPLETHORPE: THE CATALOGUE RAISONNÉ

CONTROVERSIAL PHOTOGRAPHER Robert Mapplethorpe's entire oeuvre—the beautiful, the cruel, and the perverse—is showcased in this handsome slipcased-in-cloth box. All his works are presented, including homoerotic photographs that ignited the still- smoldering debate over public arts funding that nearly brought down the National Endowment for the Arts. Smut or courageous art? You decide. Mapplethorpe's exquisite formal sensibility is more clearly seen in hundreds of PG-rated still lifes, flower shots, abstracts, and portraits. Chronicle Books/Digital Collections, Inc., $349, 800/722-6657, http://www.chronbooks.com

READER SERVICE NO. 797

HISTORY & SCIENCE Back to the Future

By Derk Richardson

CRITICAL MASS: AMERICA'S RACE TO BUILD THE ATOMIC BOMB

STARTING FROM A SINGULAR historical episode—"America's Race to Build the Atomic Bomb"—and using multimedia to expand the lens, Critical Mass sheds light not only on World War II but also on the broad sweep of 20th-century culture and politics. The legendary Manhattan Project of scientists Oppenheimer, Teller, and others is the touchstone; but the Cold War, bomb shelters, antinuclear activism, and environmentalism are all brought into this superbly designed compendium of text, video, biographies, and customizable slide shows. What could have been a bomb turns out to be a blast. Corbis, $49.95, 800/246-2065, http://www.corbis.com

READER SERVICE NO. 798

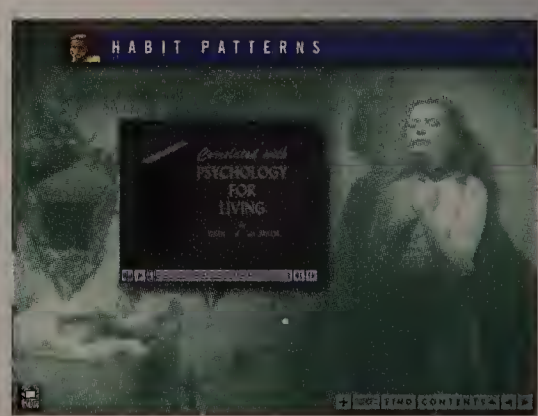
EXPLORING THE LOST MAYA

AMONG THE WORLD'S LOST CIVILIZATIONS, the Central American Maya holds special appeal because of its cryptic rise and fall and its intriguing temple architecture (still being excavated). Exploring the Lost Maya captures a sense of awe and mystery with layers of documentary evidence from the earliest expeditions, easy-to-navigate interactive maps, explanations of the complex Mayan calendar, and spectacular photography, including maneuverable panoramic views of temple sites. Sumeria, $49.95, 415/904-0800, http://www.sumeria.com

READER SERVICE NO. 799

OUR SECRET CENTURY: VOLUMES 1 AND 2; VOLUMES 3 AND 4

IF U.S. CORPORATIONS hadn't succeeded so well in shaping our desires, attitudes, and behavior, the "educational" films of the thirties, forties, and fifties captured on Our Secret Century would be merely laughable camp. But the short films from archivist Rick Prelinger's collection highlight the sinister side of nostalgia even as they ▶



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[DICTIONARY OF THE FUTURE, PAGE 531]

lost (lôst) ***adj.*** [archaic] **1.** unable to locate one's position, as in, "Help. I am lost." **2.** having no sense of direction at all **n.b.** became obsolete in 1996 with the introduction of Street Atlas USA 4.0 and Tripmate.

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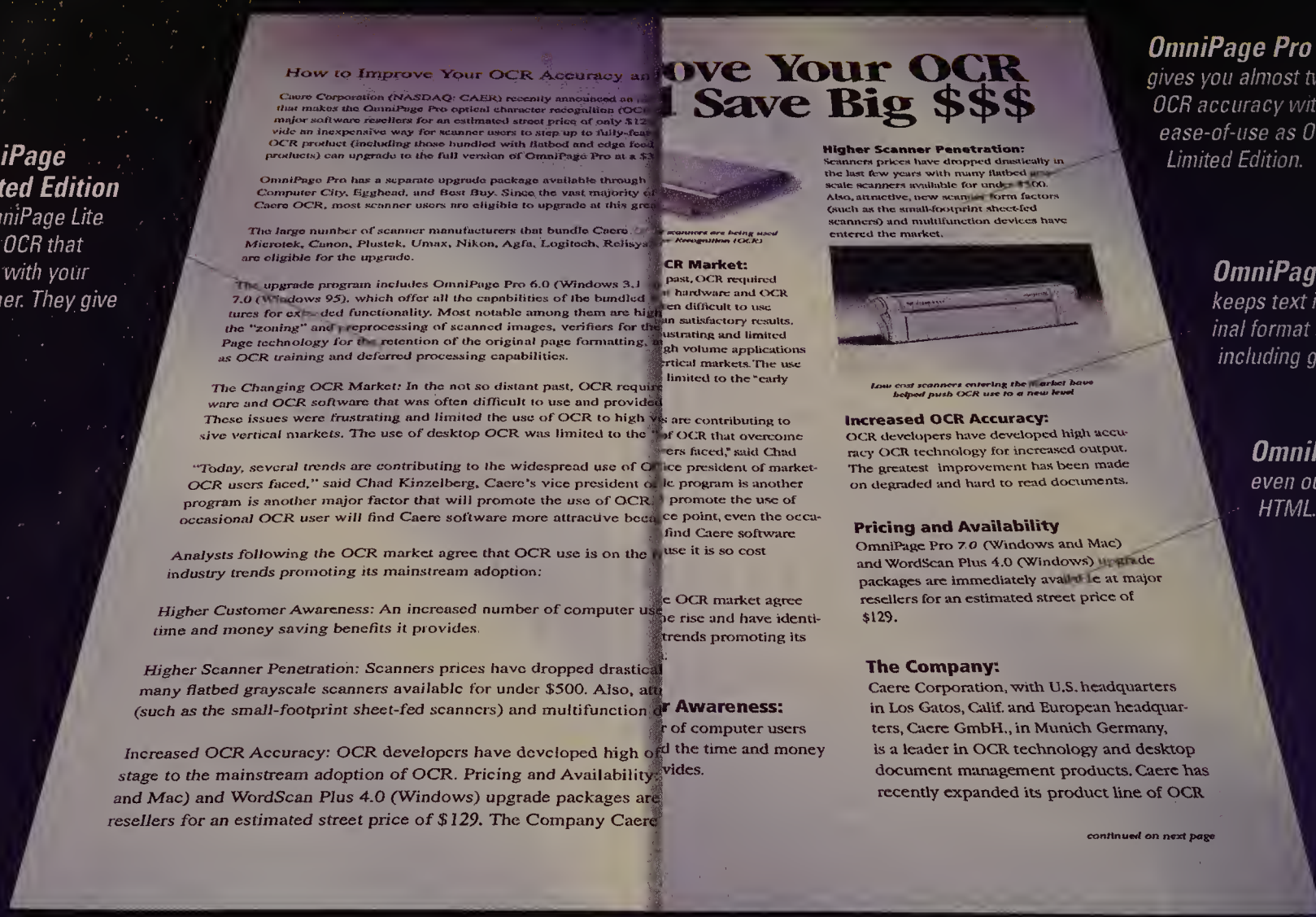

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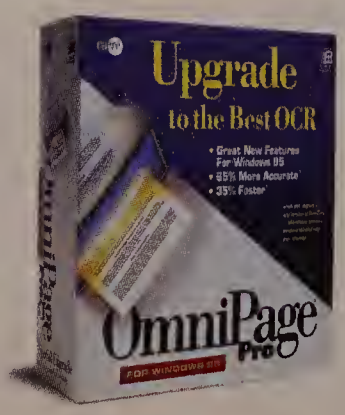

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Circle 91 on reader service card

inspire chuckles. There's only slight interactivity here but content galore in the 26 films about consumerism and mass production that make up volumes 1 and 2, and family values and safety in volumes 3 and 4.

Voyager, $29.95 each double set, 800/446-2001, http://www.voyagerco.com

READER SERVICE NO. 800

REDSHIFT 2

GUIDED TOURS THROUGH such celestial events as the birth of the solar system and the evolution of a star, a full astronomy dictionary, and a gallery of beautiful space photographs give Redshift 2 its visual and educational punch. But its tour de force is the complex planetarium that lets you view and manipulate the night sky of just about any historical moment from any vantage point on Earth. The learning curve is steep—but once you've scaled it, the sky's the limit.

Maris Multimedia, $39.95, 800/639-8717, http://www.maris.com

READER SERVICE NO. 801

POTPOURRI Health, Hearth, and Hops

By Laurianne McLaughlin

GREETINGS WORKSHOP

MOM WAS RIGHT: The best presents *are* homemade. With Greetings Workshop, you can surprise someone with a card, create a photo-filled calendar, or design unique party invitations. Personalized announcements, cards, invitations, calendars, awards, banners, and flyers don't require an ounce of artistic talent. Just start with the ready-made designs and then customize them with your own text and pictures. Armed only with this disc and a color ink jet printer, you can definitely impress your loved ones.

Microsoft, $29.95, 800/426-9400, http://www.microsoft.com

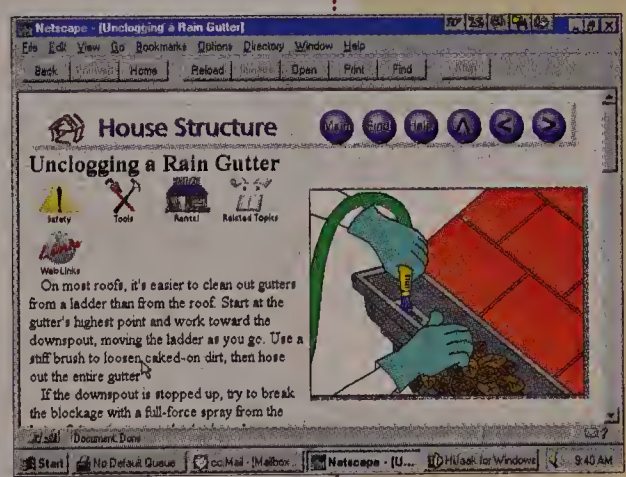
READER SERVICE NO. 802

HOME IMPROVEMENT ENCYCLOPEDIA

NO MORE SMIRKS from salespeople in the tool department: I'm talking the Tim Allen talk after using this well-organized guide. Even if you're an expert, you'll like the level of detail the disc provides. It includes a glossary of tool names with pictures, concise instructions for emergencies such as pipe bursts, and tool rental tips. The disc is also loaded with links to useful Web sites that have been reviewed by the disc's editors. The rating system? No stars, just hammers.

Books That Work, $29.95, 800/242-4546, http://www.btw.com

READER SERVICE NO. 803



Home Improvement Encyclopedia's clear visuals show you how to do it.

MICHAEL JACKSON'S WORLD BEER HUNTER

THIS DISC CERTAINLY goes to the head of the glass. Beer aficionados will enjoy a leisurely crawl through this classy reference. It includes video lessons about different beers and how to judge a brew. Tap into a world microbrewery tour: Just click on a globe to zero in on a continent, country, state, or city, then look at a map that identifies breweries in the area. Listen to a regional overview, or select a brewery to hear about its specialties and Michael Jackson's appraisal. Yeah, Jackson knows his lager rhythms.

Discovery Channel Multimedia, $39.95, 800/678-3343, http://www.beerhunter.com

READER SERVICE NO. 804

TIP

SLIPPED DISCS 3

If your drive can't read the CD-ROM you inserted, the disc may be in the wrong format. Some discs are mistakenly labeled Windows/Mac when they are Mac format only. Return the disc to your retailer for the right version.

THE A LIST CONTINUED

CD-ROMS

MONTY PYTHON AND THE QUEST FOR THE HOLY GRAIL

FIND INZANITY searching for the Grail. For devout Python fans. 7th Level, $49.95, 800/884-8863, http://www.7thlevel.com

READER SERVICE NO. 828

(October 1996)

THE MUPPET CD-ROM: MUPPETS INSIDE

GOOFY PUZZLES, original video and animation clips, and the best use of Windows 95 ever will keep you smiling. Starwave Corp., $39.95, 800/457-8646, http://www.starwave.com

READER SERVICE NO. 829

(June 1996)

ONE SMALL SQUARE: SEASHORE

ROAM THE SHORE, study the tides, and use the magnifying glass to zoom in on 3-D micro-ecosystems. For kids ages 6 to 12. Virgin Sound and Vision, $34.95, 800/814-3530, http://www.virgin.com

READER SERVICE NO. 830

(September 1996)

OPERATION: WEATHER DISASTER

TEST YOUR meteorological wits against the evil Weatherman. Ages 10 and up. Discovery Channel Multimedia, $39.95, 800/678-3343, http://www.discovery.com

READER SERVICE NO. 831

(January 1996)

PARENT'S GUIDE TO CHILDREN'S SOFTWARE '96

A CRITICAL RUNDOWN OF the top 250 children's CDs reviewed by *Newsweek* editors and a group of kids. Newsweek, $29.95, 800/634-3002, http://newsweek.com

READER SERVICE NO. 832

(December 1995)

PRINTPAK'S PARTY-FUN KIT

PARTY DOWN with this preparation package that lets you make your own invitations, birthday banners, party bags, and stickers. Great for kids 5 and up. PrintPaks, $24.95, 800/774-6860, http://www.printpak.com

READER SERVICE NO. 833

(October 1996)

THE RESIDENTS BAD DAY ON THE MIDWAY

THE PATH TO THE unknown lies ahead as you join a bunch of geeks and carnies in a twisted sideshow that's marvelously macabre. Don't follow the rules; you'll be rewarded for being nosy and voyeuristic. Inscape/ Warner Active, $49.95, 800/ 693-3253, http://www.pathfinder.com

READER SERVICE NO. 834

(April 1996)

SAVAGE

GO AHEAD, BE WILD. As you grow from a playful cub to a vicious king-of-the-jungle lion, learn the savage life and meet all its challenges. Discovery Channel Multimedia, $39.95, 800/678-3343, http://www.discovery.com

READER SERVICE NO. 835

(August 1996)

SPYCRAFT: THE GREAT GAME

PROTECT THE PRESIDENT in your role as a top CIA operative. If you want danger and excitement, this is the job for you. Activision, $44.95, 800/477-3650, http://www.activision.com

READER SERVICE NO. 836

(July 1996)

VOLCANOES: LIFE ON THE EDGE

A DISC THAT GUSHES: Follow photographer Roger Ressmeyer on assignment with *National Geographic* for a fascinating exploration. Corbis, $50, 800/246-2065, http://www.corbis.com

READER SERVICE NO. 837

(May 1996)

WHO IS OSCAR LAKE?

DRILLS, DRILLS, AND MORE DRILLS are what you get in most language CD-ROMs. But not in Who Is Oscar Lake? Separate versions of this mystery game immerse you in Spanish, German, Italian, French, or English. At the start of the game, a jewel thief frames you for a heist. You're in a foreign country with no translator. Only by speaking the language can you prove your innocence. You gather clues and start conversing in your new language as you interact with characters. You click on objects to learn more words, and record your voice to compare your accent to how the language actually sounds. The experience won't even remotely remind you of high school foreign language classes.

Language Publications Interactive, $79.99, 800/882-6700, http://www.languagepub.com

READER SERVICE NO. 805

TIP

SLIPPED DISCS 4

If your drive can't read the CD-ROM you inserted, and the reason is not 1, 2, or 3, the disc could be defective. Return it to the retailer for a new copy.

KIDS CORNER Green Eggs and Barbie

By Roberta Furger

BARBIE FASHION DESIGNER

I KNOW WHAT YOU'RE THINKING: "Barbie on a disc? What's next? The Cindy Crawford Makeup CD?" You have to see this one to realize how good it is. Kids (who says only girls play with dolls?) design their own Barbie clothes and then print them out using specially designed printer fabric bundled with the disc. There's no sewing—just attach the enclosed tape, glue on a sequin or two, and voila! You can hand-paint the fabric if you own a black-and-white printer. The package supplies enough material for eight outfits. Fabric refill kits cost $9.99. Ages 6 and up.

Mattel Media, $44.99, 310/252-2000, http://www.mattelmedia.com

READER SERVICE NO. 806

FREDDI FISH 2: THE CASE OF THE HAUNTED SCHOOLHOUSE

WHAT HAPPENS WHEN TWO adventuresome fish set out on the trail of one very stubborn ghost? You wind up with a game that'll captivate children for hours. Freddi Fish 2, the latest adventure game from Humongous Entertainment, boasts the usual features: a scavenger hunt in which kids track down the tools Freddi and her pal need to solve the mystery, and some cool games to keep them busy along the way. Ages 3 to 8.

Humongous Entertainment, $39.95, 800/499-8386, http://www.humongous.com

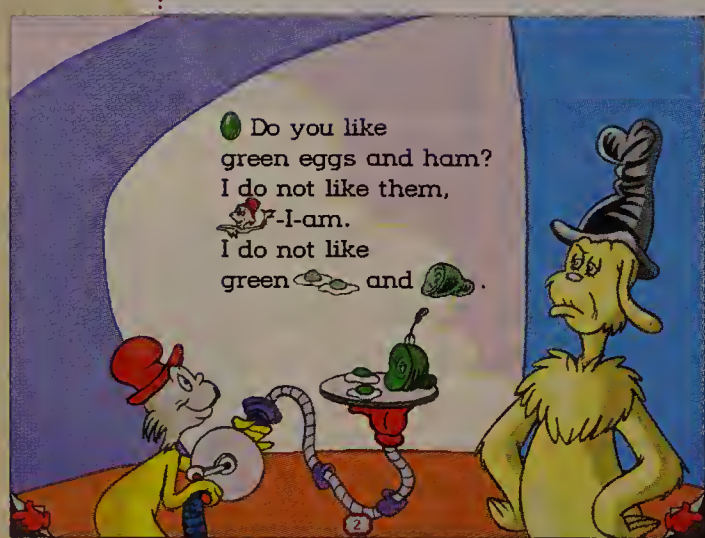
READER SERVICE NO. 807

GREEN EGGS AND HAM

SAM-I-AM SPRINGS TO life in Living Books' multimedia version of one of Dr. Seuss's most famous books. Young kids will discover animated surprises as they follow Sam in his relentless attempt to get the old grouch to sample his strange green eggs. Kids can go directly to games, or just play them as they come across them in the story. Purists might be offended by the new rhymes that Living Books has added to complement the animations, but children will love to see the story come to life. Ages 3 to 7.

Living Books/Broderbund, $36, 800/397-4240, http://www.livingbooks.com

READER SERVICE NO. 808



It's alive! It's alive! The popular Dr. Seuss book bursts with sound and visual delights.

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1,000 ANSI lumens / SVGA resolution

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Learn more about the 3M MP8650 and what else is new from the power brand in electronic projection. Contact us today for a FREE video and interactive CD-ROM explaining presentation technologies and solutions.

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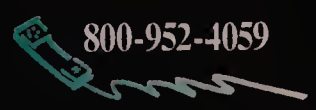

http://www.mmm.com/office
e-mail: presentations@mmm.com

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Circle 7 on reader service card

DVD

CD-ROMs ON STEROIDS

PROMISES, PROMISES: We expected the debut of Digital Versatile Disc technology to happen in the fall of this year, but we're still waiting. The next-generation format for data storage, a DVD-ROM looks just like a standard CD, except that its storage capabilities are massive—from 4.7GB to 17GB. By comparison, a standard CD-ROM maxes out at 650MB. DVD is also designed as a replacement for VHS video tape, with the capacity to hold a full-length movie with 32 subtitled language tracks and enhanced surround sound. You can also expect higher-quality full-motion video and heightened interactivity overall.

Hardware manufacturers and software suppliers have been locked in a battle with movie studios, which are demanding that some form of copy protection be built into DVD players. Alas, even though the DVD players are ready to go, only a single program can currently play on them.

Despite the gridlock, Philips Electronics and Sony Corporation announced the beginnings of a patent licensing plan for DVD-Video and DVD-ROM players and discs last August. In an effort to push forward through the delays, Sony has authorized Philips to execute the licensing program.

Digital Directory Assistance's $99 PhoneDisc PowerFinder USA One, the only DVD-ROM on the market to date, places the contents of six CD-ROMs on a single DVD-ROM. This lets you search all 112 million business and residential listings in the United States—including both the white and yellow pages—from a single disc. In addition to searching the listings by name, the DVD-ROM also searches by address, telephone number, business type, and U.S. Census demographics. PhoneDisc also lets you conduct a quick search by distance—for instance, every gas station in a 3-mile radius. All it needs now is a DVD drive to play on. As to when that will happen, we'll have to wait and see. —Aoife McEvoy

INTERNET

READ EXTENDED VERSIONS of these reviews as well as additional ones exclusively on PC World Online (http://www.pcworld.com).

Kids can customize more than 100 challenging interactive jigsaws in PlaySkool Puzzles.

MARTY IN WHERE'S MORGAN?

THINK YOU NEED A MOUSE and a keyboard to use a computer? Think again. Attach a microphone to your sound card and Marty, another type of mouse, comes alive on your screen. Kids help the mouse find his smaller sister Morgan just by speaking into the microphone. Along the way they play peekaboo, sing a song, and help a spider stay awake long enough to spin her web. When the scenes change, the characters say different things, wear different clothes, and sing different songs. Ages 2 to 5.

Maxis, $29.95, 800/336-2947, http://www.maxis.com

READER SERVICE NO. 809

PLAYSKOOL PUZZLES

KIDS LOVE JIGSAW PUZZLES. Now PlaySkool has turned the age-old pastime into a fun and mind-expanding game. The disc is packed with more than 100 puzzles, each of which can be broken up into as few or as many pieces as needed to challenge the skill level of the child. What sets this game apart, however, is how it lets kids transform the premade puzzles into their own creations. For example, they can change the color of the characters, add new stamps, or build their own puzzles from scratch using the many drawing tools. Ages 3 to 6.

PlaySkool, $19.99, 800/638-6927, http://www.hasbro.com

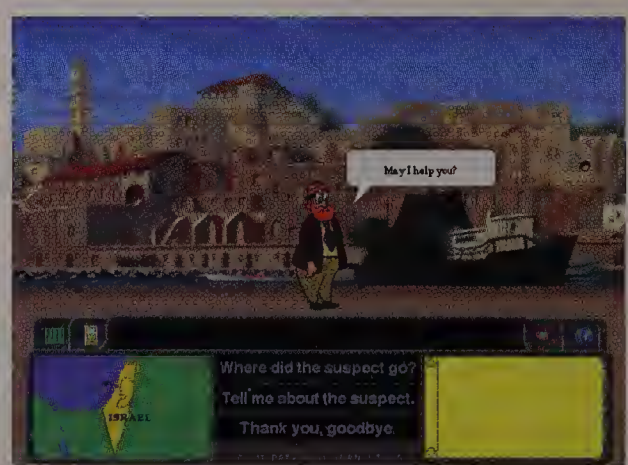
READER SERVICE NO. 810

WHERE IN THE WORLD IS CARMEN SANDIEGO?

IF YOUR 10-YEAR-OLD THINKS the Roman Colosseum is where the Italian national soccer team plays its matches, check out the latest version of Broderbund's best-selling world geography program. As the latest recruits to the Acme Detective Agency, kids jet around the world in search of Carmen and her gang of crooks. Their investigations take them to 50 countries, where they interrogate witnesses, take a guided tour, or search the database for more detailed information to assist in tracking the elusive thieves. It's challenging, fun, and educational—in short, a hit. Ages 9 and up.

Broderbund Software, $40, 800/521-6263, http://www.broderbund.com

READER SERVICE NO. 811



"If this is Tuesday it must be..." The Carmen Sandiego CD still keeps kids and adults guessing.

Steve Anzovin is East Coast editor of Computer Entertainment News *and editor of* Art in America. *Steve Klett is senior reviews editor at* PC Games. *Dennis O'Reilly is an editor at* Information Access Company. *Derk Richardson writes for the* S.F. Bay Guardian. *Aoife McEvoy is an assistant editor, Laurianne McLaughlin an associate editor, and Michael S. Lasky a senior associate editor at* PC World. *Roberta Furger and James Martin are contributing editors.*

For more information about all products in this article, circle reader service no. 838. ■

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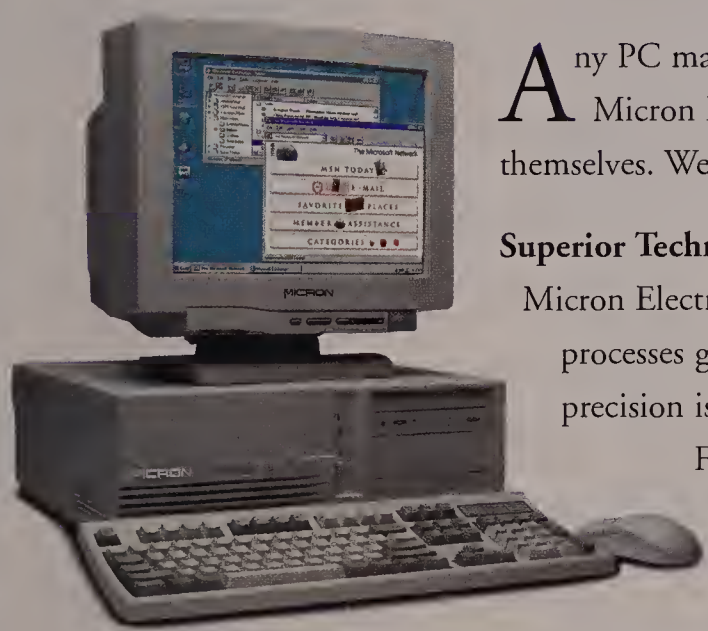


Any PC maker can claim to offer a solution that covers your needs. But at Micron Electronics, we prefer to let our history and our products speak for themselves. We think you'll agree it's an impressive story.

Superior Technology—A Micron Tradition

Micron Electronics builds PCs with a legacy of excellence. Our manufacturing processes grew out of nearly two decades in the semiconductor business, where precision is measured in millionths of an inch, and quality in parts per million. From this solid background, we're forging unbeatable systems you can count on today and tomorrow.

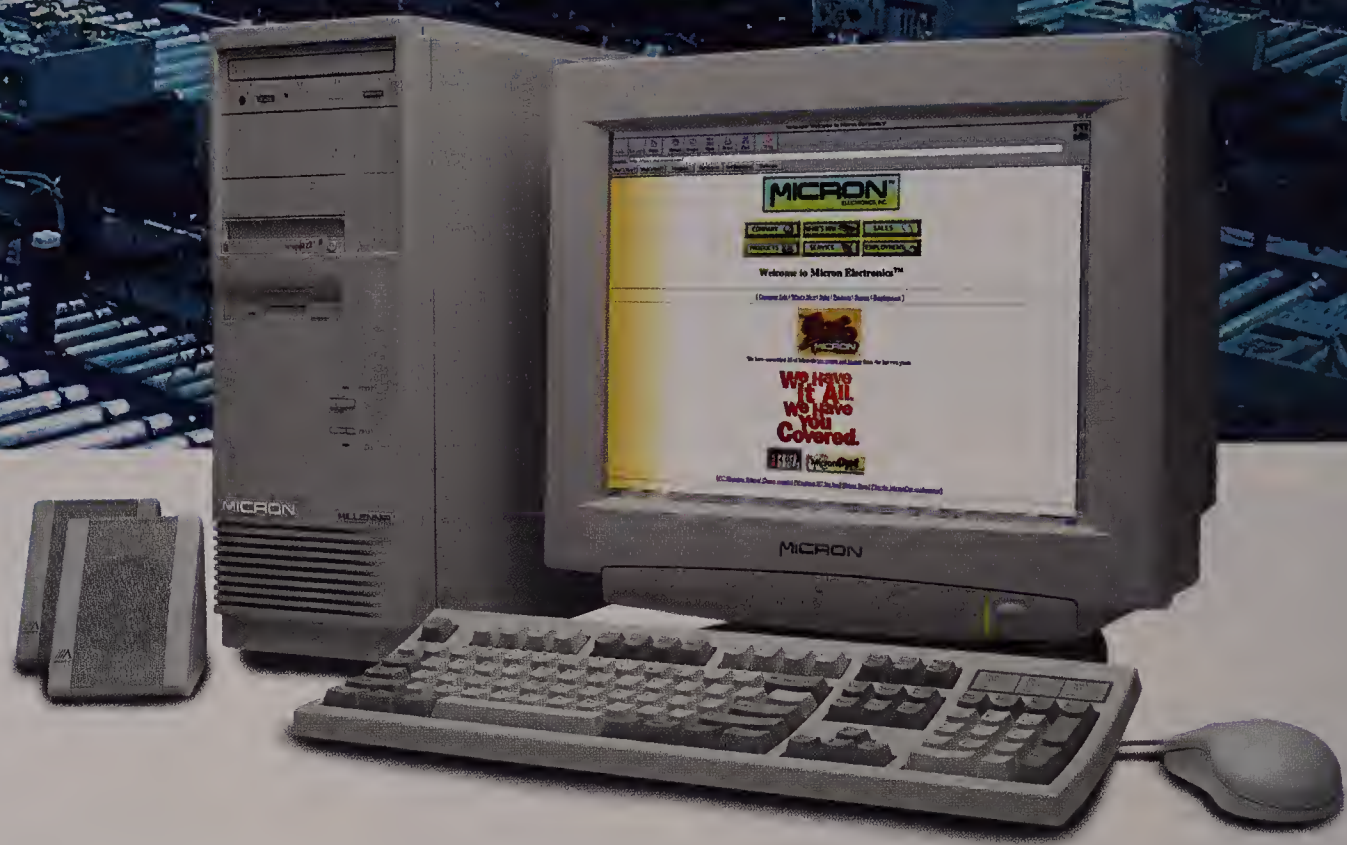
Award-Winning Products

In the past two years, leading industry publications have applauded Micron Electronics PCs with more than 140 awards. This includes *PC Magazine* Best Products of 1995 and Editors' Choice awards in several categories. Add more than 40 *PC World* Best Buy awards and you've got an impressive technology hall of fame. In fact, just this summer, we have won three *PC Magazine* Editors' Choice® Awards for Millennia™ desktop and Millennia TransPort™ notebook computers.

Micron Power℠ Warranty—An Industry First

We support our reliability promise with the industry-leading Micron Power warranty. It backs the microprocessor and main memory for five years, an industry first. Add a three-year, parts-only system warranty and a 30-day money-back guarantee, and you can rest assured that you're in good hands.

Micron Electronics brings high-tech manufacturing to the PC factory floor. Recently we've invested millions of dollars to build the most advanced PC manufacturing facility possible.



Outstanding Performance—Don't Take Our Word for It.
Talk is cheap when you're speaking for yourself. But when it's from the mouth of an industry expert, it carries weight. Here are a few of many examples of what they're saying about our PCs:

- **Home MPC** *". . . the fastest we've ever tested . . . as well as a marvelous family package . . . it wins our Top Rated award. . . ."* ***—Family PC,*** **May 1996**
- **Millennia** *"In short, Micron covers all the bases with this Best Buy."* ***—PC World,*** **March 1996**
- **Millennia TransPort** *". . . nearly a dead ringer for IBM's ThinkPad . . . but performs better and saves you about $2,500."* ***—PC Magazine,*** **April 1996**

The Right System for You
Micron Electronics makes a suite of outstanding solutions designed for the way you work or play. From home systems to servers, desktop PCs to portable multimedia solutions, Micron Electronics always comes through with a system built to satisfy. For details and prices, turn the page.

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The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions of sale. Terms and conditions of sale may vary for specific configurations. Copies of the limited warranties may be obtained on our Web site or by calling Micron.

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- Prodigy, America Online & CompuServe trial memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO RAM
- 17" Micron 17FGx, .26dp (15.8" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 & MS Plus! CD
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- Quicken Financial Pak includes: Quicken Deluxe; Quicken Financial Planner; Quicken Parents' Guide to Money; and Quicken Family Lawyer
- Family Pak includes: ABC by Dr. Seuss; Thinkin' Things Collection 1; Earthworm Jim; and Mechwarrior 2
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NEW

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PC MAGAZINE EDITORS' CHOICE — June 25, 1996 Millennia P166

PC MAGAZINE EDITORS' CHOICE — June 25, 1996 Millennia P133

PC MAGAZINE EDITORS' CHOICE — August 1996 Millennia TransPort P133

PC MAGAZINE EDITORS' CHOICE — May 30, 1995 Millennia P120

PC MAGAZINE EDITORS' CHOICE — May 16, 1995 Home MPC P90

PC WORLD BEST BUY — January 1996 Millennia P133

Windows Stellar APRIL 1996 — April 1996 Millennia TransPort

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- Advent AV370 Powered Partners stereo speakers w/subwoofer $199
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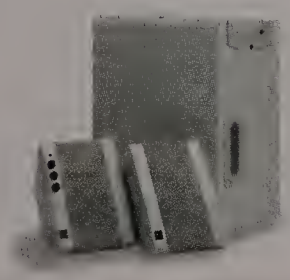

Storage/Media Options

- Adaptec® 2940U Ultra SCSI Fast-20 controller $100
  (upgrade from system with standard Ultra SCSI Fast-20 controller)
- Plextor 12Plex 12X 1.8MB/S SCSI internal CD-ROM drive $200 **
  (upgrade from systems with standard 12X EIDE CD-ROM drive)
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- Iomega 6-pak of 100MB Zip cartridges $99
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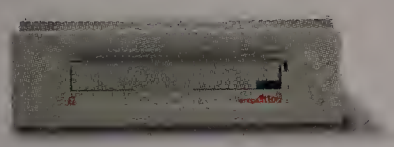
- Sony 4/8GB DDS-2 DAT SCSI Tape back up w/tape $999 **



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- SMC ISA TokenCard network card $199

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- EdVenture Pak, including: Sheila Ray, the Brave; Putt-Putt® Saves the Zoo™; Reader Rabbit's Reading Development Library™ 1; Freddi Fish™ and the Case of the Missing Kelp Seeds™; and the Thinkin' Things™ Collection 2 $69
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- 21" Hitachi SuperScan 2111 (20" display) .26dp color monitor $650 ††
- #9 Imagine 128 series II video card w/4MB VRAM. $500 †††
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- Motorola Montana 28.8 fax/modem supports regular telephone connections, cellular phones and two-way paging devices $259
- 150MHz Pentium processor $200
- 3Com® Ethernet 10BT PCMCIA $149
- Samsonite® leather bag $99
- 2nd modular Lithium-ion battery $199
- 2nd hard drive (1.3GB) $599
- 2nd hard drive (2.1GB) $699
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- 32MB DIMM module upgrade $749

Service Options

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- Extended 3-year on-site service coverage for desktop systems $139
  (upgrade from optional 1-year on-site service coverage)
- Complete on-site PC installation (call Micron Electronics for details) $159

Other Options

- APC Pro7T surge suppressor $39
- APC Pro7T surge suppressor $59
- Microsoft Natural Keyboard® $49
  (upgrade from standard keyboard)

* Upgrade from systems with standard 16-bit stereo sound card
** Requires SCSI Host Adapter
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† Requires sound card
†† Upgrade from systems with standard Micron 17" 17FGx color monitor
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All Supra modems come standard with revolutionary features like V.80 video-phone capabilities. The new **SupraExpress 336 Sp** offers full-duplex speakerphone along with Rockwell ASVD (analog simultaneous voice and data)—meaning you can talk to other PC users while sharing files and playing games. Diamond also offers a complete ISDN solution—delivering all the hardware and software you need for 128,000 bps access to the Internet. So, if you're ready for modems that surpass all your expectations—take the lead with Diamond.

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33.6 Kbps Data	♦	♦	♦
Voicemail & Fax	♦	♦	Fax Only
ASVD	♦		
Hands-Free Phone	Speakerphone	Headset	
LCD Display		♦	

SupraExpress™ 336 Sp

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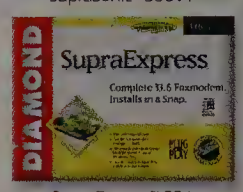

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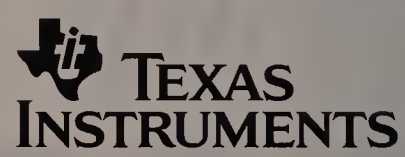

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PC RELIABILITY AND SERVICE

GOOD-BYE TO GOOD SUPPORT

In our latest report, nearly 12,000 readers rate their PCs and the companies that make them. The results: First-rate customer service is getting much harder to find.

YOU'D NEED THE PATIENCE of a saint. Just ask Ava Sterling.

The problems with her Compaq 486-DX2-66 began in February 1995—and she still hasn't gotten them solved. "The telephone-answering and fax components will not work properly," reports Sterling, who works for the New York City Department of Health. Compaq has replaced the modem board four times, to no avail.

"When I called Compaq initially, they thought it was a hardware problem, so I didn't have to pay for their service," says Sterling. Later the company began charging for software support, to her frustration. "But now we've figured it's a software problem, and I'm not willing to pay $35 for a tech support call, so this problem has never been resolved."

Sterling's experience is far from unique. According to survey results from nearly 12,000 *PC World* readers, problems are on the rise, service is going downhill, and customer satisfaction has dropped across the board.

Every month readers use our fax-back survey to report their experiences with PC reliability and support. The survey asks them to rate PC vendors on a wide range of criteria, from the objective ("How long did it take to resolve the problem completely?") to the subjective ("Based on the service and sup- ▶

BY JEFF BERTOLUCCI

port you received, would you buy this brand of PC again?"). In tabulating the results, between December 1995 and July 1996, we included data only for readers who've purchased a PC within the last two years. Of the manufacturers in the survey, 15 received at least 96 responses, making them eligible for our current ranking (see chart on page 146).

The results are not encouraging. Since our last report in March, the non-DOA problem rate has risen slightly—from 48 percent of all respondents' machines to nearly 51 percent. Readers reported longer waits before they reached a technician who could help them: an average of just over 30 hours, compared to 28 previously. Overall satisfaction has dropped; a smaller percentage of respondents would buy another PC from the same company.

Why the decline? The impact of Windows 95 on support departments and the continued growth of the home PC market have played pivotal roles. And as profit margins have narrowed, vendors are looking for cheaper alternatives—including, in some cases, charging customers for support services that used to be free.

PC VENDORS ARE SEEKING CHEAPER SUPPORT ALTERNATIVES—LIKE CHARGING FOR SERVICES THAT USED TO BE FREE.

SIMPLY THE BEST

FOR THE FIRST TIME since we began rating reliability and service in June 1994, only two companies achieved a top overall rating on our charts. Dell and Micron were the only vendors in our survey to earn top scores in both the reliability and service categories. Readers with Dell computers continue to be pleased by the vendor's low problem rates and speedy technical support, while owners of Micron PCs experienced fewer unresolved problems than respondents for any other company in our survey.

Dell owners report that the Austin, Texas, computer giant has reduced the time callers must spend trying to reach the right technician by an average of more than 2½ hours since our last report.

Scott Andersen can testify to the positive effects of Dell's customer service. Andersen, a mortgage banker in Howell, New Jersey, had trouble with his two-month-old Dell Dimension XPS P-100 last February. "First I had problems with the sound card, and I couldn't play my CDs. Then the CD-ROM drive door wouldn't open and my PC kept crashing."

Despite the problems, Andersen was impressed with Dell's efforts to return his PC to good health. The company sent a technician to Andersen's home to change the P-100's cache and replace the motherboard, and dispatched another techie to replace the defective CD-ROM drive at a later date. "I had multiple on-site visits, the technicians ran every diagnostic program possible, and ultimately they fixed my problem," recalls Andersen.

Meanwhile, Nampa, Idaho–based Micron was rated tops in user satisfaction based on service. The downside: Micron respondents reported having to wait much longer for service than in our March report. In recent months, *PC World* has received complaints from Micron owners that the waits are growing longer, not shorter. If true, Micron's stay at the top of our charts may be brief.

Winners and Losers

Only Dell and Micron achieved five stars in both reliability and service, earning them a Best rating overall. Since our last report in March, AST fell the farthest, from Fair to Worst, due to very poor reliability scores.

[1] Numbers indicate total responses that resulted in each company's ratings. Companies are listed alphabetically. See "A Word About the Numbers" for complete methodology.

OVERALL	RELIABILITY	SERVICE
BEST	**BEST**	**BEST**
Dell Micron	Apple 125 [1] Compaq 995 Dell 1136 Hewlett-Packard 285 Micron 671	Dell 304 Micron 173
GOOD	**GOOD**	**GOOD**
Apple AT&T (NCR) Compaq Digital Hewlett-Packard	AT&T (NCR) 117 Digital 167	Digital 58 Hewlett-Packard 80
FAIR	**FAIR**	**FAIR**
Gateway 2000 IBM Quantex	Gateway 2000 1753 IBM 608 NEC 254	Acer 167 Apple 31 AT&T (NCR) 35 Compaq 283 Gateway 2000 613 IBM 211 MidWest Micro 50 Quantex 134
POOR	**POOR**	**POOR**
Acer MidWest Micro NEC	Acer 431 Quantex 392	AST 138 NEC 88
WORST	**WORST**	**WORST**
AST Packard Bell	AST 358 MidWest Micro 96 Packard Bell 1282	Packard Bell 549

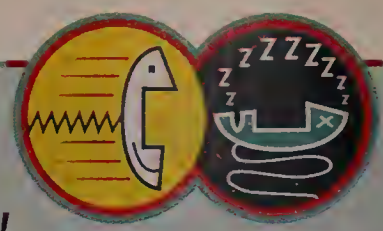
GOOD, NOT GREAT

WHILE DELL and Micron made it to the top, perennial reliability and service champion Compaq Computer found itself in an unusual position: the second tier. For the first time, Compaq dropped from Best to Good overall. Though the world's leading PC maker continued to receive top marks for system reliability, respondents were less pleased with the quality of service, reporting longer waits for help and a surprisingly high percentage of problems that never got fixed.

It wasn't just Compaq, either. Apple, Digital Equipment, and Hewlett-Packard also dropped from Best to Good overall since our last report. This time around, Apple customers reported long waits before they were able to get help, Digital was dragged down by a relatively high rate of unresolved problems, and Hewlett-Packard respondents reported an increase in DOA components.

Muzak to Your Ears

Who will probably...



...pick up quickly?		...keep you hanging on?	
Company	Average hold time	Company	Average hold time
Apple	5.5 minutes	AST	16.2 minutes
AT&T (NCR)	5.6 minutes	Packard Bell	16.2 minutes
Hewlett-Packard	7.6 minutes	NEC	15.2 minutes

Average hold time for all companies: 11.5 minutes
Source: Based on service reports for hold times in PC World's Reliability and Service survey, December 19, 1995, through July 26, 1996.

Equally dramatic is the continuing decline of AST Research, whose service and reliability rankings have nose-dived over the past two and a half years (see "AST's Free Fall"). Ranked as one of the four best manufacturers overall in our June 1994 report, AST shares the lowest rating with Packard Bell this time around. Packard Bell was rated Worst in every category except for one—component DOA.

AVA STERLING CANNOT RELY on her Compaq PC to record messages. "When I go out of town I have to turn off my computer and use a regular answering machine."

Quantex is the only other company in addition to Dell and Micron that actually rose in our respondents' ratings, climbing a notch from Poor to Fair overall. But more companies stumbled this time around. For instance, IBM dropped from Good to Fair overall, and NEC plummeted from Good to Poor.

WATCHING THE DEFECTIVES

DESPITE THE DROP our readers reported in system reliability across the industry, five companies received high marks for building machines people could count on. This time around, Dell joined Apple, Micron, Compaq, and Hewlett-Packard at the top of the reliability chart. Digital, however, dropped from Best to Good since our last report, owing to a big jump in its problem rate.

At the top of the heap, only about 37 percent of respondents with Apple computers reported a problem with their systems; Micron, Dell, and HP were all close behind. Less than 2 percent of Compaq respondents reported getting a new machine that was dead on arrival.

By contrast, nearly 70 percent of respondents with MidWest Micro computers reported problems. The Fletcher, Ohio–based vendor was joined in the Worst tier by Packard Bell and AST, each of which suffered problem rates of 59 percent or more. Meanwhile, nearly 5 percent of respondents with AST or Packard Bell PCs reported getting a DOA system.

What parts are likely to arrive dead on the doorstep? It depends on the vendor. Of the Gateway repondents who suffered DOA problems, 18 percent had DOA experiences with monitors. MidWest Micro respondents who had DOA problems reported dead floppy drives (36 percent), sound boards (27 percent), and CD-ROM drives (18 percent).

ARE YOU BEING SERVED?

BY FAR THE WORST decline since our last update occurred in service. Only Micron and Dell achieved Best status in service, with Digital and HP qualifying as Good.

Apple respondents spent the least amount of time on hold (5.5 minutes on average), followed by AT&T (NCR) and HP. Digital took the least time on average to provide our respondents with a helpful technician (just over 17 hours), while MidWest Micro resolved problems the fastest (in just over 4 days). At the top, only 3 percent of Micron owners reporting problems didn't get them resolved. Next best at solving problems—according to the data we received—were Quantex (4.1 ▶

Best and Worst

Readers Rate PC Reliability and Service

Which PC makers build the most reliable machines? Which vendors respond the fastest to a user's cry for help?

The listings within each tier (such as Best or Good) are alphabetical. In all cases, five stars is the best possible rating.

★★★★★ **BEST**									
Dell Top-notch reliability and service, marred only by some DOA components.	★★★★★	★★★★	★★★★	★★★★★	★★★★★	★★★★	★★★★★	★★★★★	★★★★★
Micron Excellent marks overall, but be prepared to wait awhile for help.	★★★★★	★★★★	★★★★	★★★	★★★★	★★★★★	★★★★★	★★★★	★★★★★
★★★★ **GOOD**									
Apple Machines are as dependable as ever, but service has slipped.	★★★★★	★★★★	★★★★★	★★★	★★★★	★★★★	★★★★	★★★★	★★★★
AT&T (NCR) Despite good overall reliability, respondents are not very satisfied.	★★★	★★★★★	★★★★★	★★★	★★★★★	★★★★	★★★★	★★★	★★★
Compaq Great reliability, as usual, but fee-based support plan has some users fuming.	★★★	★★★★★	★★★★★	★★★	★★★	★★	★★★	★★★	★★★
Digital Only middling at fixing problems; most respondents are satisfied.	★★★	★★★★★	★★★	★★★★	★★★★★	★★★	★★★★	★★★★	★★★
Hewlett-Packard Stellar reputation offset by problems that never get fixed.	★★★★	★★★	★★★	★★★	★★★	★★★	★★★★	★★★★	★★★★
★★★ **FAIR**									
Gateway 2000 Faulty parts and lengthy waits test customers' loyalty.	★★★	★★★★	★★	★	★★★	★★★	★★★★	★★★	★★★
IBM Plagued by problems but fixes them quickly.	★★★	★★★	★★★★★	★★★	★★★★★	★★★	★★★★	★★★★	★★★
Quantex Great at solving problems—and has lots of practice doing it.	★★	★★★	★★	★	★★	★★★★★	★★★★	★★	★★★
★★ **POOR**									
Acer Trouble-prone systems leave most users dissatisfied.	★★	★★	★★★★	★★★	★★★	★★★	★★★	★★★	★★
MidWest Micro A sea of troubles, and many callers are left stranded.	★	★★★★★	★	★★★	★★★★★	★	★★★★	★★★★	★★★
NEC Painfully slow at resolving problems, but most customers would buy again.	★★★	★★★★	★★	★★	★	★★	★★★★	★★	★★
★ **WORST**									
AST Continues its slide, with scary problem rates and lousy service.	★	★★	★★★★	★★	★	★★	★★	★	★
Packard Bell At least it's consistent.	★	★	★★★★	★	★	★	★	★	★

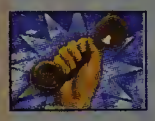
The Star System

Stars correspond to companies' relative rankings generated from raw scores in each category. Five stars indicate best performance.

PROBLEM RATE
The percentage of all respondents reporting one or more non-DOA problems. Five stars: 37 to 39 percent. Four stars: 44 to 45 percent. Three stars: 51 to 52 percent. Two stars: 54 to 56 percent. One star: 59 to 70 percent.

SYSTEM DOA RATE
The percentage of all respondents who reported one or more of the following components dead on arrival: hard drive, motherboard, CPU, or power supply. Five stars: 0 to 1.8 percent. Four stars: 2 to 2.5 percent. Three stars: 3.1 to 3.3 percent. Two stars: 4.2 to 4.5 percent. One star: 4.7 percent.

COMPONENT DOA RATE
The percentage of all respondents who reported one or more "non-system-level" components dead on arrival. Five stars: 3.2 to 4.8 percent. Four stars: 6.5 to 6.7 percent. Three stars: 7.1 to 7.4 percent. Two stars: 8.3 to 8.8 percent. One star: 11.5 percent.



TIME TO TALK
How long respondents reporting problems said it took them to reach a support staffer who could help. Five stars: 17 to 19 hours. Four stars: 23 hours. Three stars: 25 to 26 hours. Two stars: 30 to 34 hours. One star: 36 to 39 hours.

TIME TO RESOLVE
How long respondents said it took the company to repair problems. Five stars: 4.4 to 6.7 days. Four stars: 7.8 to 8.2 days. Three stars: 8.6 to 8.9 days. Two stars: 9.5 days. One star: 11.5 to 13.3 days.

UNRESOLVED PROBLEMS
The percentage of all respondents reporting that their problems were never resolved. Five stars: 3 to 4.1 percent. Four stars: 7.1 to 8 percent. Three stars: 8.7 to 9.8 percent. Two stars: 10.5 to 11.6 percent. One star: 13.2 to 14.3 percent.

BUY AGAIN BASED ON SERVICE AND SUPPORT
The percentage of all respondents reporting problems who would buy from the company again, based on service. Five stars: 87 to 82 percent. Four stars: 77 to 71 percent. Three stars: 66 to 61 percent. Two stars: 55 percent. One star: 46 percent.

LOW SATISFACTION
The percentage of all respondents reporting lower-than-average satisfaction with service and support. Five stars: 16 to 18 percent. Four stars: 22 to 23 percent. Three stars: 26 to 30 percent. Two stars: 32 to 33 percent. One star: 40 to 47 percent.

HIGH SATISFACTION
The percentage of all respondents reporting higher-than-average satisfaction. Five stars: 60 to 56 percent. Four stars: 53 percent. Three stars: 48 to 47 percent. Two stars: 44 to 40 percent. One star: 32 to 23 percent.

SCOTT ANDERSEN was very pleased with Dell's technical support, both over the phone and in his home. "I thought their service was fantastic. My PC works fine, and I'm happy."

percent) and AT&T (NCR) (7.1 percent).

In general, however, our readers say they're waiting longer for worse service. Packard Bell owners reported average hold times in excess of 16 minutes, tying the company with AST for longest hold time on the list. Even worse, it took PB respondents 39 hours on average to reach a support staffer who could help them. Still, PB wasn't as slow at fixing things as NEC, which took an average of 13 days to resolve problems.

Basil Bennett, NEC vice president of customer service and support, believes NEC's poor showing in our survey could be due to the push into the home and small office market earlier this year.

"We were definitely behind the curve, especially at the beginning of this calendar year," Bennett says. "The first couple of months were difficult." Since then, NEC has added more tech support staff and hired a third-party tech support company to assist with customer calls. We checked the latest data available to us at press time, and NEC owners reported a slight improvement in the time it took to reach help and solve problems.

Perhaps the most interesting statistic is the high number of problems that went unresolved. On average, nearly one in ten of all respondents with a problem never got it resolved. The worst offender here was Packard Bell, which failed to fix over 14 percent of our respondents' problems. The real shocker was which company was third worst: Compaq. Nearly 12 percent of respondents with Compaq systems who had problems never got them resolved. And in this case, the story behind the numbers may have less to do with the quality of the support than with its cost.

PAYING THE PRICE

LAST JANUARY Compaq went out on a limb by introducing a fee-based support plan for most of its Presario home PCs. If a Compaq technician diagnoses your problem as being non-hardware-related, Compaq charges $35 per question at its toll-free number or $2 per minute (with a $30 charge limit) at its fee-based 900 line.

When readers with Compaq systems reported a high number of unresolved problems, we decided to investigate. We called all readers who said their problems were never solved, and spoke to most of them. Their troubles were all over the map—memory, hard drives, video cards, fax-modems. But many of them also had a serious problem with Compaq's fee-based support policies. In fact, half the respondents we interviewed had elected to live with their systems' problems rather than pay to have them solved.

Take Larry Miller, an innkeeper in Archdale, North Carolina, who bought a Compaq Presario 9546 in January. "My PC was having conflicts with some of the demo software that came preinstalled along with Windows 95, which I couldn't figure out," he says. Miller's system kept crashing, and he wasn't sure which files to delete to fix the situation. "I was not going to call Compaq and pay $35 just to get an answer. I have a real problem with a company who has a three-year guarantee that offers no software support."

Is our readers' reaction to paid sup- ▶

PHOTOGRAPH BY JOHN ABBOTT

port linked to their satisfaction? You bet. While Compaq still scores fairly high—76 percent of respondents said they'd buy another Compaq machine, based on the service they received—that figure is 11 points lower than in our last report. And 28 percent of respondents with problems rate their satisfaction with Compaq as less than average, almost double the percentage in our March report.

Tom Carothers, Compaq vice president of customer service, acknowledges that the fee-based plan hurt the company's standing with its customers. But he cites two other reasons for the dramatic drop in service scores: the introduction of Windows 95, and the highest sales figures in Compaq's history during the same period.

"When you put all of these things together, it's clearly going to have a negative impact on customer service," says Carothers. In addition to an increase in support staff, Carothers notes that since February 1996, Compaq has been charging for only about 14 percent of the calls made to its support lines, down from 35 percent before that date. And technicians no longer request a caller's credit card number before diagnosing the problem.

However, Carothers adds, the company's fee-based plan is probably here to stay. "We wish that we didn't have to charge anyone," he says. "Compaq needs to charge callers to remain competitive."

Compaq isn't the only manufacturer that charges for support during the warranty period. IBM's Aptiva line comes with 60 days of free telephone support for setup, configuration, and software problems. After this period Aptiva owners are charged for software questions, especially those involving how to use a particular program. NEC and Packard Bell also charge for support calls but only after a system is out of warranty.

Though it's hard to establish a direct correlation between a vendor's support policies and its customer satisfaction scores, respondents are clearly less satisfied with all four companies that charge for support. This time, 47 percent of IBM owners reported higher-than-average satisfaction, compared to 56 percent last March. NEC's rating in this category dived from 53 percent to 41 percent, and Packard Bell's rating sank from 31 percent to 23 percent.

Fix It or Forget It?

Who will probably...

...solve your problems?		...offer fewer solutions?	
Company	Percent never resolved	Company	Percent never resolved
Micron	3.0	Packard Bell	14.3
Quantex	4.1	MidWest Micro	13.2
AT&T (NCR)	7.1	Compaq	11.6

Average problems never resolved for all companies: 9.7 percent
Source: Based on ratings of service reports for unresolved problems in PC World's Reliability and Service survey, December 19, 1995, through July 26, 1996.

ALTERNATIVE MEANS OF SUPPORT

NO MATTER HOW you slice it, providing technical support to thousands of users is expensive. PC profit margins, once fat enough to cover the cost of a large support department, have been trimmed to the bone. So while some companies, such as AST, have responded to service complaints by beefing up their support staff, others are trying out cheaper options.

One popular alternative to seating techies at a phone bank is to make technical information available on the company's Web site, in the hope that users will log on, search the site, and solve their problems themselves. NEC, Acer, ▶

AST's Free Fall

IT'S BEEN A TOUGH YEAR for AST. The Irvine, California-based company posted a net loss of $115.8 million during the first quarter of fiscal year 1996 on revenues of $530 million. Since June 1994 AST's service and reliability ratings have worsened, according to our respondents. This time around, AST scored a Poor or a Worst in every category but one (component DOA).

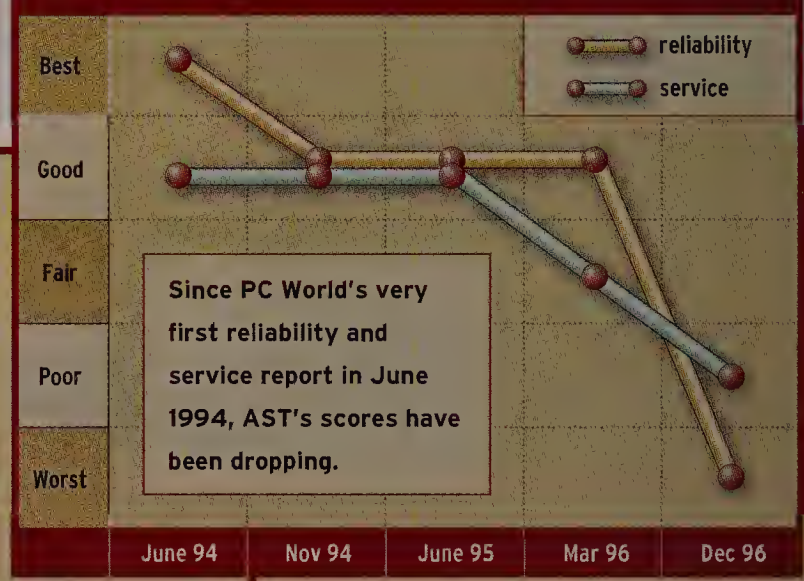
Gartner Group analyst Leslie Fiering believes AST's decline was caused by its lack of world-class manufacturing cost-containment programs. "Despite AST's financial troubles, I think they're going to turn it around," says Fiering. The reason? Korean electronics giant Samsung has recently invested heavily in AST, and is helping the troubled computer maker improve its design and manufacturing process.

Matt Doyle, AST vice president of service and support, agrees with Fiering. "We have put the downward trend behind us," says Doyle. "In addition to our partnership with Samsung, we boosted our technical support staff to 300 earlier this year—a 30 percent increase." As well as hiring more call takers, AST uses a third-party support provider to assist with customer questions during peak calling times.

Has the reversal really begun? Feedback from AST owners during more recent months shows some evidence of an overall improvement in AST's service scores. Readers reported that it was taking less time to reach AST technicians for help, and fewer problems were being left unresolved.

Says Doyle, "AST has renewed its emphasis on quality design, giving us a recent drop in computer failure rates, better service, and more satisfied customers all around."

Decline of AST



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Circle 128 on reader service card

Compaq, and IBM are developing knowledge bases offering users troubleshooting suggestions. Furthermore, PCs from AST, Packard Bell, and NEC incorporate Radish Communications Systems' VoiceView technology, an integrated voice and data protocol that lets users talk to and exchange data with a company technician during a single phone call.

But do users want all this automation as a substitute for a human voice? Definitely not, says Acer customer Pam Lively of Springfield, Illinois. When Lively's computer wouldn't boot, she phoned the company's tech support line—and was introduced to Acer Answer, the company's automated help service. "It asks questions about your problem, and you answer by pushing buttons," Lively says. "It takes a long time to get through—at least 15 minutes—and then you have to stay on the line to talk to a real person."

MORE HUMAN CONTACT, PLEASE: Pam Lively is not in favor of Acer's automation. "You push buttons to answer questions, and you still wait on hold for a live techie."

Do these alternatives benefit vendors more than users? Leslie Fiering, an industry analyst with the Gartner Group in San Jose, sees advantages for both parties, but not for the beginner. "If you've got a CD-ROM drive that needs an updated driver, you can pull that down from the Web, and frequently-asked-question databases are useful too," she says. "But for hand-holding situations with beginners, it's not the answer. Human support is still needed."

BUY AND BUY AGAIN?

IN THE END, it all comes down to customer satisfaction. And when around half of all PC purchases are for replacement machines, earning consumer loyalty may be the key to a company's success. At the top of our chart, more than eight out of ten Dell, Digital, Hewlett-Packard, and Micron respondents said that they would buy from those companies again, based on the service they received. At the bottom, less than half of Packard Bell respondents plan to stick with this brand in the future.

As our survey results make clear, respondents feel increasingly displeased with the quality of service that hardware vendors provide. Yet as more companies try to reduce the cost of customer support, fee-based service programs and non-human support alternatives may be here to stay. Is free quality customer support a thing of the past? Some vendors claim free support is a luxury they can't afford to provide anymore. However, companies that restrict their support to stay competitive pay the price of losing customers. And that's a very high price to pay.

Jeff Bertolucci is a freelance writer in Denver. Aoife McEvoy is an assistant editor and Harry McCracken a senior associate editor for PC World. ■

NO MORE Free Support?

Here's what you can do.

IN A WORLD where hardware manufacturers are starting to charge for software support, you have to consider your options carefully before making that call. In addition to checking the PC's manual, keep the following tactics in mind.

1 Try alternative support options. If you don't want to pay $30 or more for a call to tech support—or spend time on hold—try the company's fax-back information line or its support area on the Web, if it has one.

2 Contact the software vendor. If your problem relates to preinstalled software rather than hardware, the software vendor might be a better source of useful information.

3 When in doubt, try the PC vendor's standard help line. They won't report you to the FBI for calling the free support line with a question that doesn't qualify. And you never know: You might reach a charitable technician who will help.

4 Bite the bullet and pay. Just as some aches and pains demand immediate attention from a doctor no matter what the cost, you can't afford to ignore certain PC ailments. This way you'll get assistance fast.

5 Get your money's worth. You're paying for it, so insist on getting your problems completely solved. Dispute any overlapping charges with your hardware vendor, phone company, and credit card company.

—*Harry McCracken*

A WORD ABOUT THE NUMBERS

THE RELIABILITY AND SERVICE SURVEY is a monthly fax-back questionnaire bound into every issue of *PC World*. The rankings presented here were generated from the results of 11,776 questionnaires received between December 19, 1995, and July 26, 1996. Because the survey is not a random sampling, its results are not statistically projectable either to the larger base of *PC World* readers or to PC owners in general.

Scores and Rankings

IN ORDER TO DETERMINE the reliability ranking for each company, we used three categories: percentage of respondents who reported a non-DOA ("dead on arrival") problem, 50 percent weighting; percentage reporting a system-level DOA, 30 percent; and percentage reporting one or more other components DOA, 20 percent.

To determine the service rankings, only respondents reporting on their service experience were counted. We used six categories: average time respondents waited to talk to the person who could help them, 10 percent weighting; average time it took to resolve the problem, 20 percent; percentage reporting that their problem was never resolved, 30 percent; percentage who would buy the same brand again based on service, 20 percent; percentage reporting low satisfaction with service, 10 percent; and percentage reporting high satisfaction with service, 10 percent.

For each of the service and reliability categories, we ranked each company on a scale of 1 to 5 to determine star ratings. We determined a company's overall ranking based on the sum of its reliability and service scores, as well as on the number of stars awarded in individual categories.

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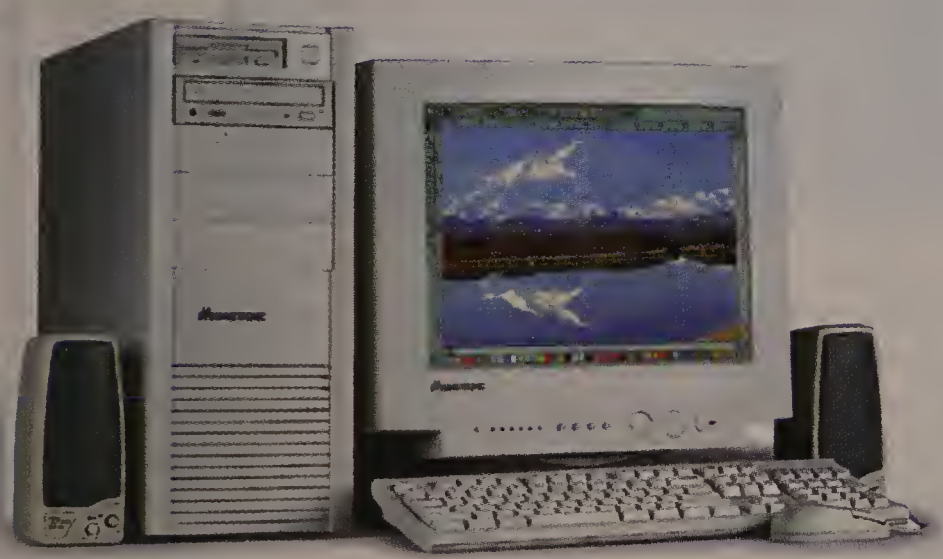

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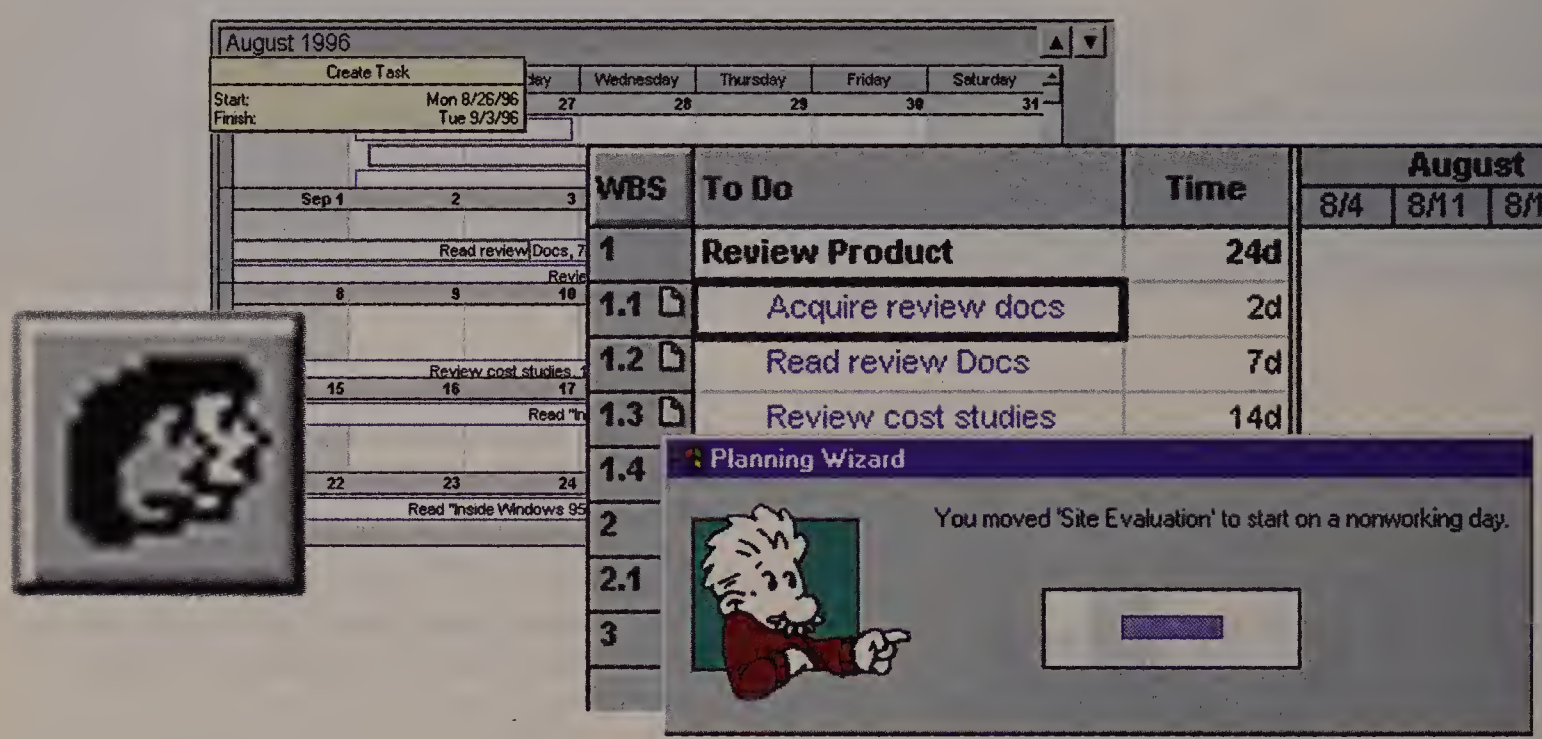

*Microsoft Project works with Microsoft Mail, cc: Mail, Lotus Notes, and the Microsoft Exchange Inbox for Windows 95.

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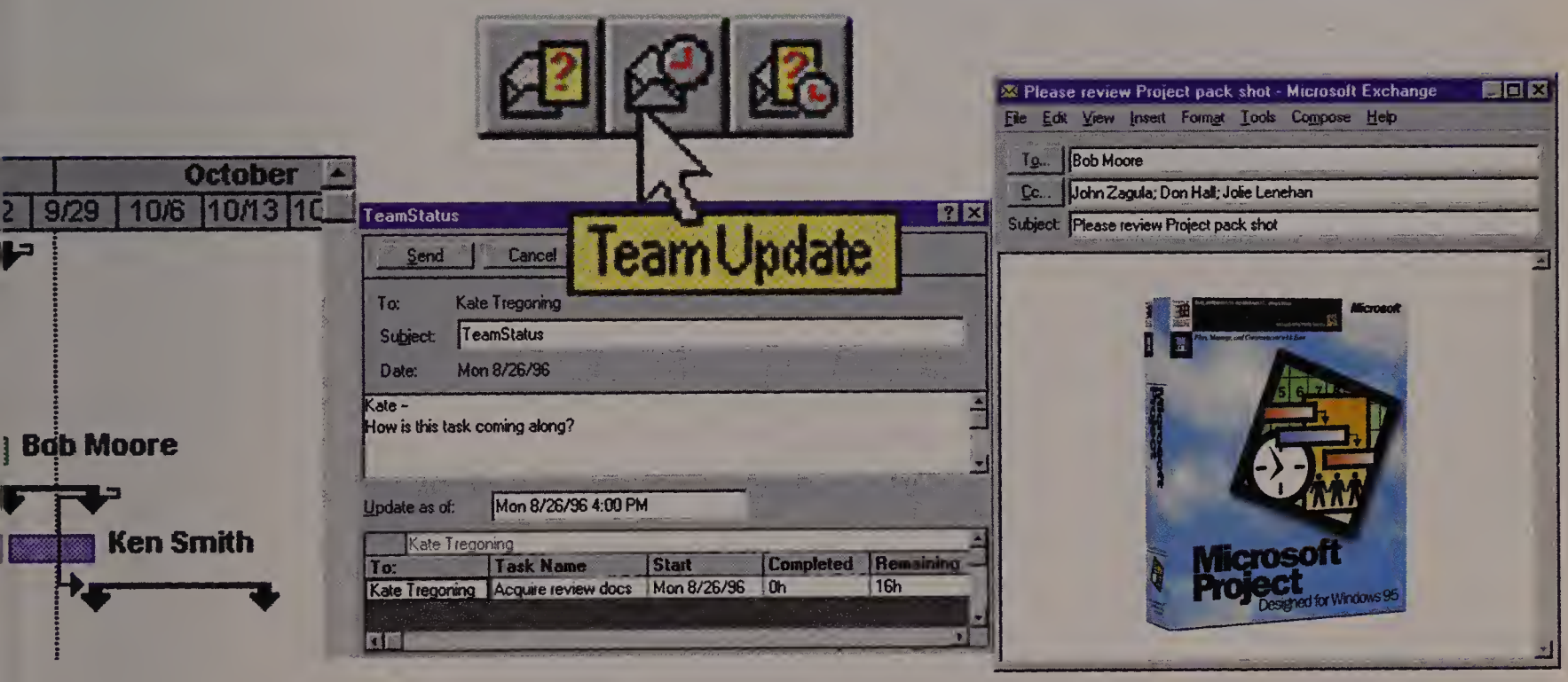

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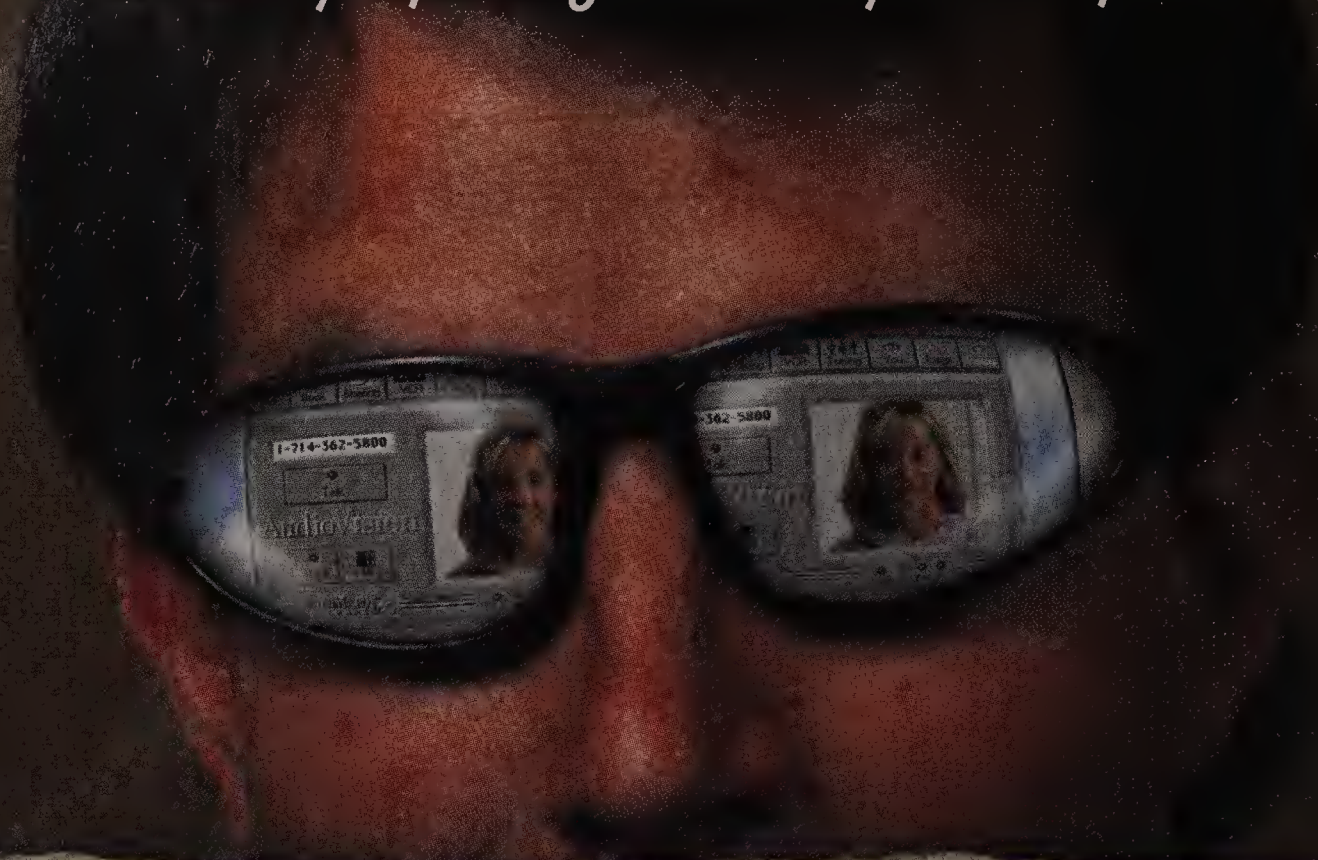

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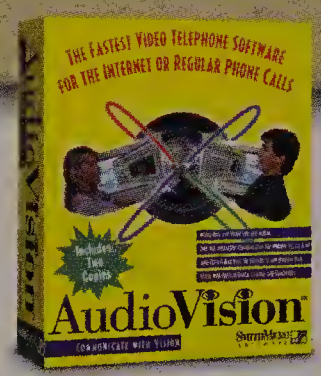
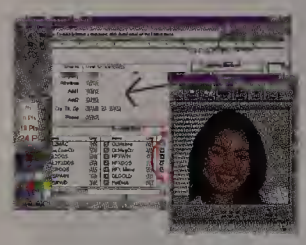


You've got Internet e-mail, Internet chat sessions and even Internet telephone calls. But if you're not communicating with live video and audio over the Internet – you're missing the picture.

AudioVision 2.0 is the amazing software that lets you communicate with live two-way audio and video over the Internet and by direct telephone connection. And AudioVision is fast, with transmission rates up to 15 frames a second over ordinary telephone lines.

With AudioVision, you can send VMail™, video e-mail that any Windows user can view – without additional hardware. And since it takes two to communicate, AudioVision includes two copies, plus a copy of AudioVision/324, the special edition of AudioVision that lets you connect with standard H.324 video phones worldwide.

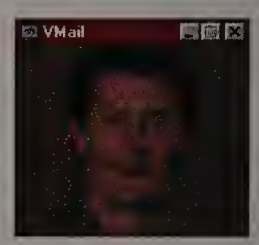
AudioVision supports virtually all major digital cameras and most capture boards and it's a breeze to install and use. So stop missing the picture, pick up AudioVision or download a free demo version at www.smithmicro.com



call the plant in asia over the Internet and discuss scheduling using the whiteboard

call grandma and show her how the kids have grown

call home from a business trip using your laptop



send a 2 minute VMail to a customer in a file that's less than a megabyte

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Circle 211 on reader service card

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The all-new TapeStor drives from Seagate. Easy to use. Easy to install. Hard to do without.

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Circle 209 on reader service card

Personal Printers

Great Values for Every Budget

With prices as low as $179, it's tempting to buy two printers —one for work, one for home. From fast monochrome lasers to versatile color ink jets, we pick the best.

By Harry McCracken

PHOTOGRAPHS BY ROBERT OLDING

HOLIDAY BEST BUYS

GO AHEAD. Put a printer at the top of your shopping list this season. Prices are low, and the capabilities are endless. If you are outfitting a small or home office, our top monochrome printers offer business-minded print quality for standard text-based documents, and adequate or better gray-scale capabilities (for the Top 10 chart that accompanies this article, see the Top 100 section). If printing your own stationery, cross-stitch patterns, or digital photographs appeals to you, or if you're the proud parent of a first-grader who prefers KidPix to crayons, the newest gen- ▶

OUR BEST BUYS for the holidays: the Epson Stylus Color 500 (front) and the Panasonic KX-P6100.

eration of color ink jets offers software, inks, and media to satisfy these creative leanings and more.

Even better, aggressive price wars among vendors, combined with tempting seasonal rebates (see "Buy a Printer, Get a Check"), have yielded great values for every budget.

All the printers we tested this month cost $500 or less—some, much less. The Okidata OkiPage 4w monochrome LED printer, for example, costs just $299. Color ink jets are even cheaper. Canon's BJC-240—number five on the color chart—is only $179. Hewlett-Packard's new DeskJet 400 and LaserJet 6P and Canon's new BJC-620 and LBP-465 weren't ready in time for us to test; look for reviews in our February issue.

While no single printer can satisfy everyone's priorities, our Best Buys—Panasonic's $399 KX-P6100 monochrome laser and Epson's $279 Stylus Color 500 color ink jet—offer the best combination of features, performance, and value for a typical user.

BEST BUYS

PANASONIC AND EPSON **Top the Charts**

OUR BEST BUYS get all the basics right: They're fast, produce admirable print quality, and are easy to use. The monochrome Best Buy is Panasonic's $399 KX-P6100, a 300-dpi tower model whose speed and print quality stand out in a market full of 600-dpi competitors. Our color Best Buy is Epson's $279 Stylus Color 500, one of the few personal printers with a standard two-year warranty.

New Software, New Prices

WITH THE EXCEPTION OF Okidata's super-cheap, midget-size OkiPage 4w, none of the new printers we tested for this issue offer groundbreaking technology. Vendors have focused instead on adding software to increase the printers' capabilities and on lowering prices. For example, Epson's Stylus Color 500 closely resembles the Stylus Color II it replaces. Its print quality is a notch or two better, but the biggest difference is in price. The Stylus Color II cost $450 when we reviewed it in April; the Stylus Color 500 is just $279—and it comes with a CD-ROM of software packages that would cost about $140 purchased separately.

The holidays bring a raft of new printers to store shelves; choosing the right one can be a daunting task. Use our guidelines to get your priorities straight before you hit the stores.

Monochrome or color printer? Let your decision between monochrome and color be guided by what you plan to print. Color ink jets make graphics of all sorts more appealing. And thanks to bundled software and optional supplies, most of them make it surprisingly easy to create everything from classy business cards to T-shirt designs and printing and sewing projects for the home (see "Software and Supplies Turn Printers Into Print Shops"). Monochrome laser and LED printers, however, still do a better job with the boring-but-vital text documents that most business users print. The average laser is much quicker than a typical ink jet, creates sharper text, especially on regular paper, and costs less to operate over time.

The bottom line: A color ink jet is more versatile, especially for home, but business users with no specific need for color (say, to print presentations) will be happier with a laser or LED printer. The one "crossover" color ink jet is the HP DeskJet 820Cse, which produces fine text as well as vivid colors.

Print quality pros and cons. Nearly every monochrome laser or LED printer we've tested produces text and line art that are crisp enough for typical business purposes. However, gray-scale images such as photographs can look fuzzy or banded. The HP LaserJet 5L Xtra is a welcome exception to that rule.

Color ink jet output varies more. No matter what the ads proclaim, even the best ink jet text looks a little jagged compared to that from even a 300-dpi laser, though it's certainly good enough for casual business use. On the other hand, ink jet gray-scale images often look better than those from a laser or LED printer.

Different ink jets have different strengths. Hewlett-Packard's DeskJet 820Cse, which prints outstandingly vibrant charts on plain paper, lags behind the best ink jets in photographic printing. By contrast, the Canon BJC-4200's business graphics are generally on the dull side, but it prints splendid photo images with its special ink and paper.

Few true speed demons. Sad to say, fast performance is a rarity among personal printers. Vendors quote specific engine speeds for printers, but most models don't approach those specs

SOFTWARE AND SUPPLIES **Turn Printers Into Print Shops**

IT'S NOT ENOUGH ANYMORE just to print memos. Ink jet printers now come with software and offer special-purpose inks, papers, and other media for creating everything from T-shirts to comic books. The range of today's printing options may astound you.

◆ **BANNERS:** You can create gigantic banners on any printer, but you usually have to glue or tape sheets of paper together. HP's DeskJet 693C and Epson's Stylus Color 500 accept fanfold paper, so you can print banners several feet long—no pasting required.

◆ **BLACK-LIGHT POSTERS:** If you're a sixties survivor who never junked your lava lamp, love beads, and incense, you'll love the Canon BJC-240's and BJC-4200's ability to produce black-light graphics, using a special ink cartridge. In a darkened room under a black light, these pages give off a neonlike glow that might trigger a flashback to the Summer of Love. Cost per page is reasonable: About 12 cents for the BJC-240, 14 cents for the BJC-4200.

◆ **COMIC BOOKS:** Canon's ink jets come with a simple comic-strip designer. The best one we've seen, though, is the Lexmark Color Jetprinter 2050's Comic Creator (this printer was too slow to make the Top 10), which lets you assemble a seemingly limitless supply of muscle-bound heroes, ruthless villains, background art, and word balloons into customized comic books that you can print or view on-screen. Twelve-year-olds of all ages will have a blast.

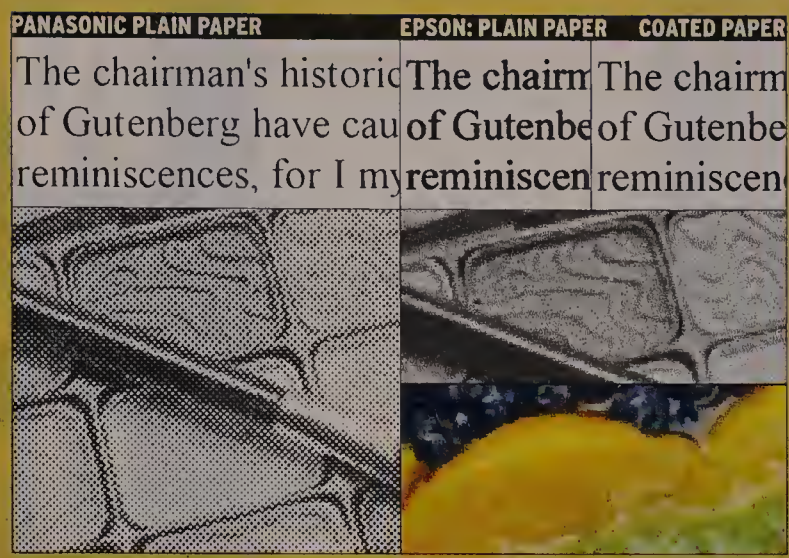
◆ **GREETING CARDS:** All the ink jets in our Top 10 come with software for printing customized greeting cards that are more personal and economical than the store-bought variety. Canon's software lets you make pop-up cards; you print the card, then cut and fold carefully along dashed lines to create the pop-up effect.

in our real-world tests, especially when printing full-page graphics. Color ink jet printers can be especially slow, even printing plain monochrome text. Most of today's pared-down personal printers delegate the dirty work to the host computer, so the performance you get is affected by your PC's speed and supply of RAM, the operating system and applications you use, and the complexity of the files you print.

Paper handling—little or less. Don't expect a personal printer to offer high paper capacity, extra-tray options, or other paper-handling features common with higher-end models. The input trays of most personal printers hold only 100 sheets; a few, such as NEC's SuperScript 860 and the Brother HL-720, boast a 200-sheet tray—convenient if you print lengthy documents and want to avoid frequent reloading. A slot that lets you feed in envelopes or stationery without removing the standard paper supply is common with laser printers but less so among ink jets.

Consider, too, how the paper comes out of the printer. Most monochrome models print facedown by default. NEC's SuperScript 860 laser and all the color ink jets print pages faceup, however, so multipage documents wind up with the last page on top and the first page on the bottom. Some bargain printers, such as Canon's BJC-240, cut costs by omitting the paper output tray entirely. Pages simply spill onto—or off of—your desk.

PRINT SAMPLES The Best Buys



RESOLUTION enhancement makes the Panasonic's 300 dpi look as good as 600 dpi.

THE TEXT samples show how coated paper makes Epson's good print quality great.

Ease of use still varies. A printer should make basic tasks such as loading paper and changing cartridges straightforward. Helpful manufacturers mark the control buttons, paper guides, and ink- or toner-cartridge holders with legends that illustrate clearly how to use them. Epson's Stylus Color 500 has a virtual mini-manual printed inside its cover.

We also look for software controls that are easy to use and understand but that also give you advanced options such as printing multiple reduced-size pages on a single sheet. When problems happen, on-screen diagnostics and manuals can be lifesavers; all the Hewlett-Packard printers on the chart excel in this area.

All the printers on the chart are Windows 95 Plug and Play compatible for easier installation. HP's LaserJet 5L Xtra goes the extra mile by including a multimedia installation tutorial on its CD. Lexmark's Optra E, on the other hand, couldn't be more complicated: It comes with several "disk #1"s, so you can't tell which to use first; and when you load the driver, you have to select the Optra E from a long list of Lexmark printers.

Cost of consumables. In the long run, toner or ink cartridges and other consumables can cost much more than the printer itself. A simple text page or a small picture won't use much ink or toner, but a larger, colorful picture will use lots.

Take vendors' cost specifications with a grain of salt, just as you do their claims for engine speed. Laser or LED pages generally cost between 2.5 and 3.5 cents each; ink jets usually run a few cents more. Depending on the amount of ink or toner you use, a full-page graphic can cost from 12 cents to almost 40 cents.

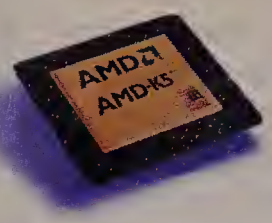
Paper costs for ink jets can add up fast, too. Unlike lasers, they produce their best results on special paper, which can range from a couple of cents a sheet for everyday stock, such as Hammermill's excellent JetPrint, to $2 a sheet for glossy filmlike media designed to make photos look their best.

Service and support. In our last full-length roundup in April, half the personal printers came with warranties of two years ▶

◆ **QUILTS:** Here's a newfangled way to make an American quilt: Canon sells 9.5-by-14-inch fabric sheets ($33.95 for a ten-pack) that you can feed through its ink jet printers and use as quilting panels. The sewing itself is still up to you, but these sheets make it reasonably easy to create panels with unique patterns and designs.

◆ **T-SHIRTS:** Canon and Epson provide software with their ink jets that lets you print a reversed image on an iron-on transfer. The biggest technical challenge involves manipulating the iron properly; it's easy to weld the transfer paper to the shirt. Each transfer costs a couple of dollars, so the process is not expensive—unless you're inspired to produce a few dozen.

There's only one problem with all these printing possibilities: You may eventually spend more on inks and media than you did for the printer. With printer prices falling through the floor, manufacturers would undoubtedly love to sell you as many supplies as possible.



With the AMD-K5™-PR133 processor, CyberMax provides its customers a viable alternative: the freedom to choose a Microsoft® Windows® & Pentium-compatible processor solution that offers superior value. The AMD-K5-PR133 processor delivers equivalent performance of a 133-MHz Pentium (chart below), making it the *best* performance value for today's desktop PC users.

AMD

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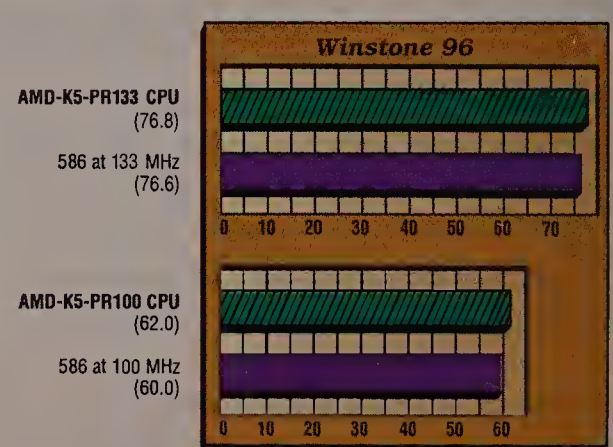
Computing takes on a whole new dimension with systems powered by the AMD K5-PR133 processor. AMD has cleverly designed processors with pinout compatibility for future 586- class PC upgrades; and the AMD K5 processor is compatible by design with the growing base of x86 and Windows compatible software. The AMD-K5-PR133 processor clearly delivers the best value for home productivity, Web connectivity and entertainment.

yes NetWare Tested and Approved

The P-Rating of an AMD-K5 processor is determined in an "apples to apples" system-level comparison. PC system manufacturers utilize this methodology, for consistent/objective rates on Pentium-relative performance for Windows applications. And the P-Rating helps end users understand true processor performance equivalences while making their PC buying decisions. For example, if an AMD-K5 processor offers the equivalent performance of a 100-MHz Pentium, it receives a P-Rating of "PR100".



The results are in! The AMD-K5 CPU series outperformed its 586 processor opponents in recent Winstone 96 testing.

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- 4-Key keyboard, Microsoft® Mouse
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Max I5-P200 $2449

- Intel Pentium 200MHz Microprocessor
- STB VELOCITY 3D Video Card w/4MB VRAM
- 32MB EDO RAM, 256K Pipeline Burst Mode Cache
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- 8x CD-ROM , Ensoniq *Wavetable* Sound Card
- Altec Lansing ACS-40 & ACS-250 Subwoofer, Microphone
- The Family Office Multimedia CD Bundle
- 33.6Kbps Fax/Voice/Spkrphone Mdm w/ *CyberSpace Pack*
- 17" Princeton Graphics NI (16.1" VA) Color Monitor
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P150.....$2249
P166.....$2349

ax A10-PR133 $1849

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- 2MB EDO RAM, 512K Pipeline Burst Mode Cache
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- tec Lansing ACS-45 speakers, Microphone
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- Altec Lansing ACS-40 speakers, Microphone
- The Family Office Multimedia CD Bundle
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- Limited 3yr Warranty with In-Home Service

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AMD K5-PR100.....$1399

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- tec Lansing ACS-40 speakers, Microphone
- e Family Office Multimedia CD Bundle
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Max A7-D133 $1199

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- 8x CD-ROM, Ensoniq Wavetable Sound Card
- 16 bit Sound Card, speakers, Microphone
- The Family Office Multimedia CD Bundle
- 33.6Kbps Fax/Voice/Spker phone Mdm w/ *CyberSpace Pack*
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Circle 74 on reader service card

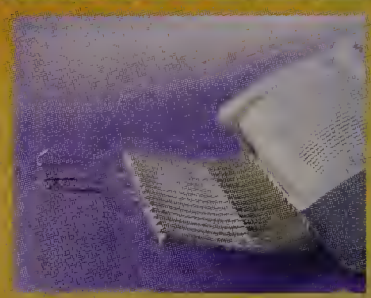
or longer. Among those on our current chart, only the NEC SuperScript 860 and Epson Stylus Color 500 have two-year coverage. At least toll-free tech support is still common, though HP and Lexmark make you pick up the cost of the call. Canon, HP, and NEC offer overnight replacement plans in case your printer conks out.

The vendors' Web sites provide varying levels of support in addition to product information. Most have driver updates and FAQs (frequently asked questions) and let you e-mail questions to tech support. But some sites are easier to navigate than others. The confusing nomenclature on Epson's site hides support under "Epson Connection." HP's site covers so many products, it takes forever to find your way. Other sites require a long time to load; Canon's and Epson's were especially slow with our 28.8-kbps modem. NEC's site just listed the e-mail address for tech support instead of providing a link or a form to expedite your call, and it had FAQs for its computers but not for its printers.

Harry McCracken is a senior associate editor for PC World. *Testing performed by Dave Casini of the PC World Test Center. Freelance writer Jon L. Jacobi contributed to this article.*

For more information about all products in this article, circle reader service no. 908.

HOT TIP



Measure the Space That Paper Trays Need

SOME PRINTERS LOOK LIKE they won't occupy much space—until you unfold the input and output trays. When calculating whether a printer will fit your desk, make sure all trays are completely extended and ready for use.

MONOCHROME PRINTERS

❶ PANASONIC KX-P6100

PRICE: $399, cost per page 2.6 cents
PRINT SPEED: 5.7 ppm text, 2.3 ppm graphics
PRINT QUALITY: Excellent text, very good graphics
EASE OF USE: Very good

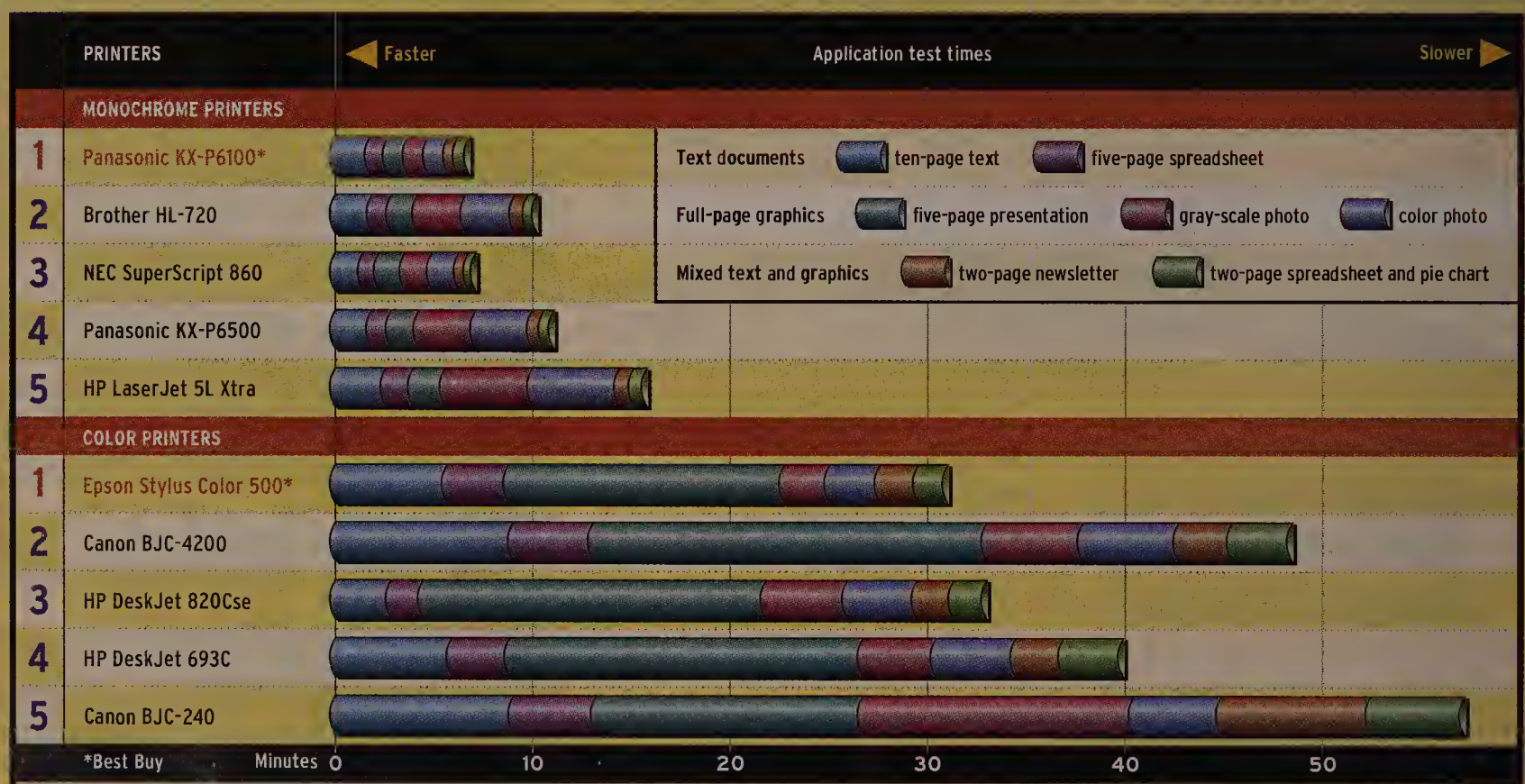
PRINTERS COME AND GO, but Panasonic's KX-P6100 has hovered at or near the top of our monochrome chart for a year. The last remaining 300-dpi model, it beats faster models that have higher resolutions because it's capable and costs only $399.

The Panasonic's resolution enhancement produces text nearly as sharp as true 600-dpi output, and its gray-scale images often look better. Because a 300-dpi printer lays fewer dots on the page than a 600-dpi unit, the KX-P6100 is also fast, especially when printing graphics.

The KX-P6100's perks include a space-saving tower profile and software controls that let you conserve paper by printing two or four miniature pages on a single sheet. Cost per page stays low because you can refill the imaging cartridge with a cleverly designed toner bottle that's nearly impossible to spill. However, you may mistake the input tray for the toner door. Our only other gripe is the lack of a manual slot for stationery and envelopes. *Panasonic, 800/742-8086, http://www.panasonic.com*

READER SERVICE NO. 697

TOP 10 PERSONAL PRINTERS — TEST REPORT



HOW WE TEST All printers are tested in default mode under Windows 95 using a Micron Millennia P90 with 16MB of RAM. Tests are timed from the point the print command is issued until the last sheet is out of the printer. Our suite of typical business documents includes ten pages of plain text and a two-page newsletter created using Word 7.0 for Windows 95; a five-page plain spreadsheet and a two-page spreadsheet with color pie chart created using Excel 7.0 for Windows 95; a full-page color photograph created using CorelDraw 6.0; and a five-page color presentation created using Harvard Graphics 4.0.

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COMPARISON	3D XPRESSION+ PC2TV	3D PRO TURBO PC2TV
Use	Games, Home, Business	Power Users, Engineers, Graphics Professionals
Maximum 3D Resolution	1024x768	1600x1200
Maximum Resolution	1600x1200 @ 60Hz	1600x1200 @ 75Hz
Memory	2MB or 4MB (2MB upgradable to 4MB)	4MB or 8MB (4MB upgradable to 6/8MB)

NOW YOU SEE IT.™

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Circle 5 on reader service card

❷ BROTHER HL-720

PRICE: $350, cost per page 2.5 cents
PRINT SPEED: 5.4 ppm text, 1.1 ppm graphics
PRINT QUALITY: Excellent text, good graphics
EASE OF USE: Very good

WITH ITS large footprint and fold-out paper tray, Brother's HL-720 looks ungainly, but aesthetics aside, it's an appealing package with an attractively low price.

It's speedier than most low-cost 600-dpi lasers, and print quality compares well, especially smooth gray-scale graphics. The design permits versatile paper handling, with an oversize 200-sheet input tray, a paper path that prevents jams, and both face-up and facedown printing. The printer comes with Surf 'n' Print for printing Web pages and other documents as booklets.

Brother markets this basic printer in multiple variations. The $400 HL-730 is almost identical to the HL-720, except that it can use PCL 4 and PCL 5e for DOS applications; most personal printers make you do this from a DOS window in Windows. Brother's $400 HL-730DX is also virtually identical to the HL-730 but adds a utility for managing Windows fonts. *Brother Int'l, 800/267-7746, http://www.brother.com*

READER SERVICE NO. 698

❸ NEC SUPERSCRIPT 860

PRICE: $499, cost per page 3 cents
PRINT SPEED: 6.9 ppm text, 1.7 ppm graphics
PRINT QUALITY: Excellent text, fair graphics
EASE OF USE: Good

BY PERSONAL PRINTER STANDARDS, NEC's SuperScript 860 laser is exceptionally fast. It's the only printer here built around an 8-page-per-minute engine. In our tests it trounced Brother's HL-720, the next-quickest 600-dpi laser on our chart, producing text 28 percent faster and graphics a resounding 55 percent faster.

This printer's $499 street price is the highest on our chart, but a $50 rebate is good through January 31, and the price includes a generous two-year warranty. The SuperScript 860 also has some of the best-designed software controls we've seen: A comprehensive on-screen manual and slick controls make it easy to create booklets, watermark effects, and more. Sadly, overall print quality varies. Text and line art are sharp, but gray-scale graphics sometimes have a gritty look.

Imperfect paper handling is the NEC's other drawback. It has a big 200-sheet paper tray, but unlike most lasers, it deposits printed pages faceup, so documents stack with the first page on the bottom and the last on top. You can flip out a secondary paper tray to print facedown, but this awkward extension increases the NEC's large footprint. *NEC, 800/632-4636, http://www.nec.com*

READER SERVICE NO. 699

BUY A PRINTER, Get a Check

As if the printer market weren't full of bargains already, several vendors are currently offering rebates.

PRINTER	REBATE	LAST DATE AVAILABLE
HP LaserJet 5L Xtra	$50	12/31/96
NEC SuperScript 660	$100	1/31/97
NEC SuperScript 860	$50	1/31/97
Panasonic KX-P6100	$100	12/31/96
Panasonic KX-P6500	$100	12/31/96

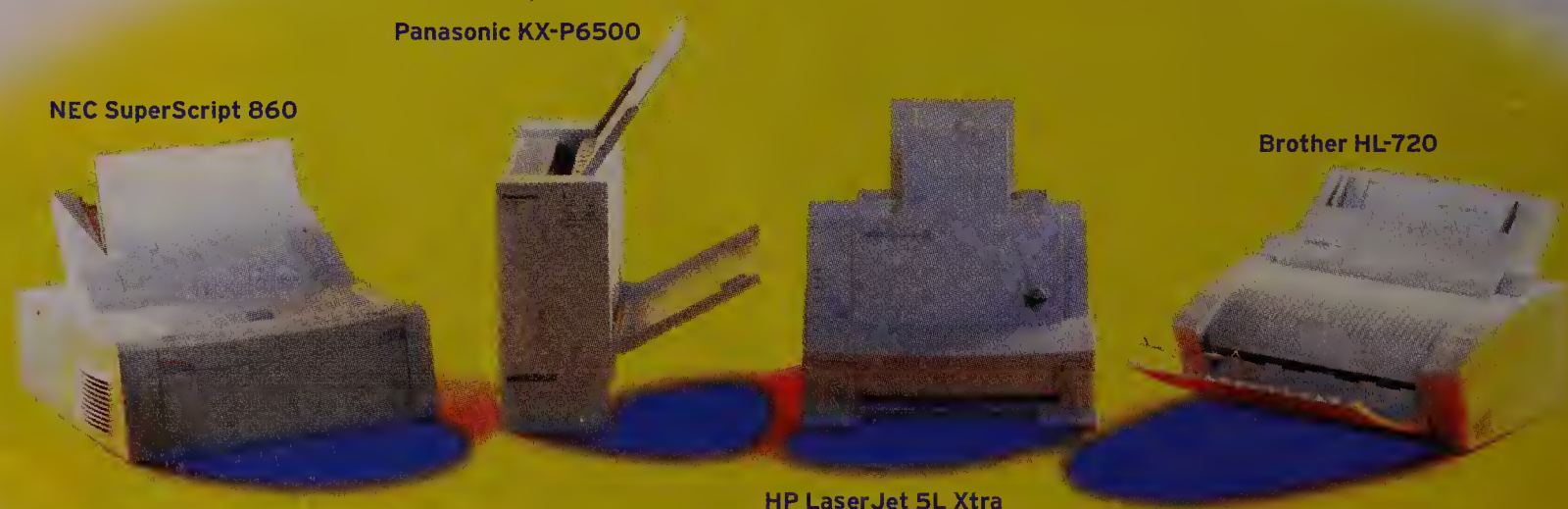
❹ PANASONIC KX-P6500

PRICE: $449, cost per page 2.5 cents
PRINT SPEED: 5.4 ppm text, 1 ppm graphics
PRINT QUALITY: Excellent text, very good graphics
EASE OF USE: Very good

THE PANASONIC KX-P6500 is a slightly more expensive, 600-dpi version of the KX-P6100, our monochrome Best Buy. The two share a svelte tower design, easy software controls, and a thrifty refillable toner cartridge. We rank the KX-P6100 higher because it costs $50 less and its print quality is nearly as good. Choose the KX-P6500's extra degree of crispness if you print lots of small type. Like the KX-P6100, it lacks a manual tray for envelopes, and its input tray can be mistaken for the toner door.

This month we retested the KX-P6500 with updated drivers. Its speed has improved, but it's still considerably slower in our tests than the KX-P6100. Compared to other inexpensive 600-dpi printers, its performance is average for graphics pages, a bit better than average for text documents. *Panasonic, 800/742-8086, http://www.panasonic.com*

READER SERVICE NO. 700



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Circle 25 on reader service card

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❺ HP LASERJET 5L XTRA

PRICE: $479, cost per page 3.3 cents
PRINT SPEED: 3.9 ppm text, 0.7 ppm graphics
PRINT QUALITY: Excellent text, excellent graphics
EASE OF USE: Excellent

IF IT WERE A LITTLE CHEAPER and a lot faster, HP's LaserJet 5L Xtra—which replaces the LaserJet 5L—would be a near-perfect personal laser. "Xtra" refers to the printer's bountiful new CD-ROM—everything from label and booklet utilities to a medical record organizer.

The LaserJet 5L Xtra has some of the best-print quality we've seen from a personal printer, especially with gray-scale graphics such as photos. Versatile paper handling lets you choose faceup or facedown output with the flick of a switch. Very easy to use, the printer has a well-organized on-screen manual, multimedia setup help, and troubleshooting tools built into its software.

For all its virtues, this LaserJet 5L Xtra is easily the slowest monochrome on the chart. If you covet raw speed, NEC's SuperScript 860 is a better choice. The $479 5L Xtra is expensive too, given its meager one-year warranty and toll-call support. HP will overnight you a new printer if yours dies, however. *Hewlett-Packard, 800/752-0900, http://www.hp.com*

READER SERVICE NO. 701

HOT TIP

Check Web Site for Updated Drivers

IF A PRINTER HAS BEEN SITTING on a store shelf, it may come with an outdated version of its own driver. Check the manufacturer's Web site or online support forum to make sure you've got the current version; vendors often release new drivers with better performance, print quality, and added features.

COLOR PRINTERS

❶ EPSON STYLUS COLOR 500

PRICE: $279; cost per page 3.8 cents (black), 13 cents (color)
PRINT SPEED: 1.7 ppm text, 0.4 ppm graphics
PRINT QUALITY: Good text, very good graphics
EASE OF USE: Very good

OUR BEST BUY among color printers, Epson's new Stylus Color 500 impressed us in almost every respect: It's faster than most color ink jets, produces some of the best-looking output, and does so for a low cost per printed page. It's also one of the few personal printers that comes with a two-year warranty.

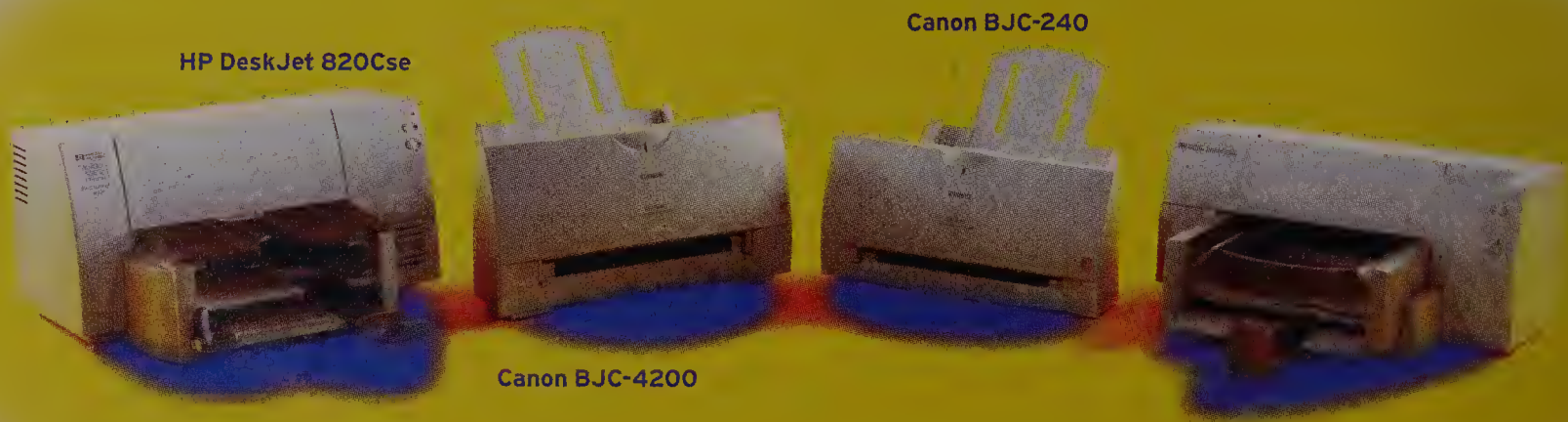
When you use Epson's special coated paper (which costs about 13 cents a sheet), colors pop off the page, and photographic images look terrific—without special photo inks such as those used by HP's DeskJet 693C and Canon's BJC-240 and BJC-4200. Output on regular paper is also bright and attractive, though stray dots can make text characters look fuzzy.

Anyone who's puzzled over a printer's confusing icons will appreciate the Stylus's clearly marked push buttons and indicators and the brief instructions printed inside the lid and on the paper tray. The Stylus 500 has no manual feed slot, however, so you must remove paper from the input tray before printing on an envelope or stationery. And although the CD-ROM bundle of Sierra Print Artist and Adobe PhotoMagic is fun, it's nowhere near as versatile as the double-CD package you get with Canon's ink jets. *Epson, 800/463-7766, http://www.epson.com*

❷ CANON BJC-4200

PRICE: $279; cost per page 4 cents (black), 14 cents (color)
PRINT SPEED: 1.1 ppm text, 0.2 ppm graphics
PRINT QUALITY: Good text, good graphics
EASE OF USE: Very good

SOME PRINTERS attain a high rank on our chart through sheer speed; others do it with picture-perfect print quality. Canon's BJC-4200 color ink jet is the first to make the grade with a knockout software bundle. Canon Creative 2 is a double CD with a diverse collection of printing tools for the home and small office. You (and your kids) can create greeting cards, picture frames, calendars, stickers, cross-stitch patterns, Norman Rockwell illustrations, Curious George picture books, and more. Media options include T-shirt transfers, quilting fabric, and neon inks. The Canon also has an easy-to-use on-screen manual, and printing options let you tailor speed and print quality to fit your document. ▶



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Circle 145 on reader service card

If it weren't for its tremendous versatility, the BJC-4200 wouldn't rank as high. It's slower than the HP and Epson ink jets in the Top 10, color output on plain paper is somewhat muted, and monochrome text looks a little washed-out. The $45 photo kit with special ink cartridge and paper produces very impressive images, though they're less photo-realistic than Canon's ads proclaim. *Canon Computer Systems, 800/848-4123, http://www.ccsi.canon.com*

READER SERVICE NO. 702

HOT TIP

Verify the Age of Ink and Toner Cartridges

STOCKING UP ON INK JET or toner cartridges? Check the expiration date before you buy—old cartridges may dry up and produce unsatisfactory pages. Don't buy so many at a time that they'll go stale before you use them all.

❸ HP DESKJET 820CSE

PRICE: $389; cost per page 4 cents (black), 12 cents (color)
PRINT SPEED: 3.8 ppm text, 0.3 ppm graphics
PRINT QUALITY: Good text, very good graphics
EASE OF USE: Excellent

IF YOU'RE A BUSINESS USER intrigued by color but hesitant to give up the speed and high-quality text of a laser, check out HP's DeskJet 820Cse. While it can't match laser speed, it's by far the fastest ink jet on the chart. Retested with new drivers this month, it's slightly faster than before. Documents have laserlike crispness even on plain paper, and simple graphics such as charts and line-art drawings look vivid. But the DeskJet 820Cse does only an adequate job with photographs (no special ink is available).

Printing is made easier with the DeskJet's easily understood software controls, plain-English on-screen diagnostics, and a manual slot for envelopes and other special media. The CD-ROM Quick Start setup tutorial doesn't do much, however, beyond telling you to consult the printed manual (which is very good).

The HP's $389 price is high compared to that of other ink jets, but it includes a copy of Microsoft Publisher—a first-rate desktop publishing package that sells separately for about $70. Two shortcomings: The price covers only a one-year warranty, and technical support is not toll-free. HP's optional warranty upgrades get you a three-year plan with either two-day or overnight replacement if your printer stops working. *Hewlett-Packard, 800/752-0900, http://www.hp.com*

READER SERVICE NO. 703

❹ HP DESKJET 693C

PRICE: $349; cost per page 5 cents (black), 17 cents (color)
PRINT SPEED: 1.7 ppm text, 0.3 ppm graphics
PRINT QUALITY: Good text, very good graphics
EASE OF USE: Excellent

MUCH AS WE LIKE most of HP's DeskJets, they've long trailed Epson and Canon ink jets in rendering color photographs. No longer: HP's DeskJet 693C uses an optional $49 photo printing kit with special inks and paper to create handsome photo output. Like Canon's claims, however, HP's are a tad inflated. As good as the results are, you won't mistake them for true snapshots.

The 693C is quicker than many ink jets we've tested, and print quality with regular ink is pretty good. Like the DeskJet 820Cse, it has well-designed software controls and a manual feed slot.

Unlike the business-oriented 820Cse, however, the 693C is aimed squarely at families with kids. It comes with Disney's 101 Dalmatians Print Studio, an engaging CD-ROM that lets you produce canine-themed cards, banners, place mats, and more. If you're a business user with no need for Dalmatian-spotted business cards, you can save about $20 by purchasing the DeskJet

TOP 10 PERSONAL PRINTERS — FEATURES

	MONOCHROME PRINTERS	Street price (8/23/96)	Printer type	Maximum monochrome resolution (dpi)	Maximum color resolution (dpi)	Rated maximum engine speed (ppm)	Standard/ maximum RAM	Width x depth x height including output trays and cables (inches)
1	Panasonic KX-P6100*	$399	laser	1200 by 300	–	6	256K/256K	5.2 x 14.9 x 11.3
2	Brother HL-720	$350	laser	600 by 600	–	6	512K/2MB	14.4 x 13.9 x 9.8
3	NEC SuperScript 860	$499	laser	600 by 600	–	8	1MB/5MB	14.6 x 16.9 x 9.1
4	Panasonic KX-P6500	$449	laser	2400 by 600	–	6	512K/4.5MB	5.2 x 14.9 x 11.3
5	HP LaserJet 5L Xtra	$479	laser	600 by 600	–	4	1MB/9MB	13.2 x 12.3 x 8.9
	COLOR PRINTERS							
1	Epson Stylus Color 500*	$279	ink jet	720 by 720	720 by 360	4	56K/56K	17 x 9.8 x 7.8
2	Canon BJC-4200	$279	ink jet	720 by 360	720 by 360	5	64K/64K	15.1 x 11.5 x 7.5
3	HP DeskJet 820Cse	$389	ink jet	600 by 600	600 by 300	5	128K/128K	17.5 x 15.6 x 8.9
4	HP DeskJet 693C	$349	ink jet	600 by 600	600 by 300	3	512K/512K	17.2 x 16 x 7.9
5	Canon BJC-240	$179	ink jet	720 by 360	360 by 360	4	32K/32K	14.2 x 19 x 6.8

*Best Buy

See Top 10 chart, page 257.

● Yes ○ No

690C, which is the same printer without the software bundle, or you can save $50 by purchasing the older but similar $299 DeskJet 682C. One big loss: HP has dumped the three-year standard warranty it once offered in favor of a one-year plan, although upgrades are available. *Hewlett-Packard, 800/752-0900, http://www.hp.com*

READER SERVICE NO. 704

❺ CANON BJC-240

PRICE: $179; cost per page 6 cents (black), 12 cents (color)

PRINT SPEED: 1.1 ppm text, 0.2 ppm color

PRINT QUALITY: Good text, good graphics

EASE OF USE: Fair

AS YOU MIGHT EXPECT, ink jet printer quality goes down along with the price. But if your budget won't allow you to spend more than $200, consider Canon's entry-level $179 BJC-240. It offers the same Canon Creative 2 printing utilities as the pricier BJC-4200, and it works with optional photo kits, T-shirt transfers, and other goodies.

The BJC-240 holds only one cartridge at a time, however, forcing you to swap when you move between color and monochrome jobs. The printer creates black areas within color documents by mixing color inks into a grayish approximation. And like other bargain-basement ink jets, the BJC-240 lacks an output tray, so you have to reserve space for printed pages to fall on your desktop. But if you can live with the BJC-240's poky speed, its decent quality make it a serviceable home printer. *Canon Computer Systems, 800/848-4123, http://www.ccsi.canon.com*

READER SERVICE NO. 705

HOT TIP

Buy a Good Parallel Cable

IF YOUR NEW PRINTER Is misbehaving, the culprit may be an outdated parallel port cable that can't handle the increase in data. You need a bidirectional cable that is compliant with IEEE 1284 standards; older or cheaper cables can cause poor-quality output and other problems.

PRINTER SNAPSHOTS

These printers were tested and reviewed, but they didn't score high enough to reach the Top 10.

Canon BJC-4550

THIS $499 COLOR ink jet is identical to the BJC-4200, except its wider carriage accepts 11-by-17-inch paper. Artists who create oversize graphics will appreciate this and the Mac compatibility. *Canon Computer Systems, 800/848-4123, http://www.ccsi.canon.com*

READER SERVICE NO. 755

Lexmark Optra E

DUE TO AN ERROR on Lexmark's part, we tested this $499 monochrome laser with a prerelease driver for the August issue. Tested with the final version, the Optra is still slow, and we had difficulty printing some full-page graphics with its standard 1MB of RAM. *Lexmark Int'l, 800/891-0331, http://www.lexmark.com*

READER SERVICE NO. 756

Okidata OkiPage 4w

SMALL, DIRT CHEAP, NO FRILLS: The $299 OkiPage 4w is an monochrome LED econobox. Although it has satisfactory print quality, this printer is slow. Also, multipage documents stack in reverse order. One tray holds both blank paper and printed pages; a flap separates them, but sometimes it's hard to tell whether you need to refill the input section or unload the output section. *Okidata, 800/654-3282, http://www.okidata.com*

READER SERVICE NO. 757 ■

			PAPER			SUPPORT					
Weight (pounds)	Plug and Play compatible	Energy Star compliant	Largest size	Capacity (sheets)	Envelope capacity	Warranty (years)	Money-back guarantee	Weekday support (hours)/ toll-free	Weekend support	On-site service available	Repair turn-around policy (days)
14.4	●	●	legal	100	10	1	○	24/●	○	○	2
14.3	●	●	legal	200	20	1	○	12/●	○	○	2
20.3	●	●	legal	200	5	2	○	12/●	○	○	1
14.4	●	●	legal	100	10	1	○	24/●	○	○	2
15.9	●	●	legal	100	10	1	○	15/○	Sat.	●	1
11	●	●	banner	100	10	2	○	12/●	Sat.	○	2
7.7	●	●	legal	100	15	1	○	18/●	Sat., Sun.	○	1
14.3	●	●	legal	150	15	1	○	15/○	Sat.	●	6
11.6	●	●	banner	100	20	1	○	15/○	Sat.	●	6
5.5	●	●	legal	100	15	1	○	18/●	Sat., Sun.	○	1

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Searching is my Business

A GUMSHOE'S GUIDE TO THE WEB

It takes more than a browser to search the Web. It takes smarts, the right tools, and tips for tracking down leads, no matter where they take you.

BY DYLAN TWENEY

THE BIG SEEK

IT WAS A COLD November morning. A fog weighed on the city like a bad hangover. I was working hard on a case of cigarettes and not much else when he walked in the door. A real mess, from his cheap business suit all the way to the 386 notebook. I could tell he was in trouble.

"I don't know what to do...I've looked absolutely everywhere and I can't find anything!" he blurted.

"Easy, kid," I soothed. "Tell me all about it."

"It all started last week. My boss called me in and asked me to do some research on Megasoft, our main competitor. So I went online and started dowsing..." ▶

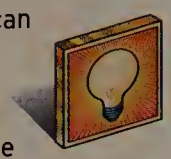
ILLUSTRATIONS BY OWEN SMITH

"Browsing," I corrected. But the kid had a point even if he didn't know it. Trying to find out about Megasoft by browsing is like looking for water in the Mojave using a forked stick.

"Yeah, whatever. Anyhow, I spent all night clicking on links, and all I found was a bunch of silly home pages and a lot of advertisements."

He was tangled in the Web and tangled bad. I had to show him how to get around, and quick. Fortunately, he came to the right place. I'm a Web searcher. I find things. That's my job.

HOT TIPS — BROWSERS



■ **Bookmark Your Queries.** Bookmark the first page of query results so you can return to it. Instead of typing *Dashiell Hammett* whenever you're looking for some detective trivia, just go back to the saved query, and the search engine will rerun it—possibly with new, updated results.

■ **Skip Scrolling.** Okay, so you found a likely Web page—but it's about 50 screens long. Never fear—in Internet Explorer or Netscape Navigator, just type <Ctrl>-F and enter a word you're looking for. The browser will jump to the first appearance of that word on the current page.

TO BROWSE AND BROWSE NOT

I TRIED TO break the bad news to him gently. "Listen, kid," I said. "Browsing is a waste of time. If you want to find anything, you gotta *search* the Web, not browse it."

Looking at him, I realized the poor sap didn't know a Web directory from a search engine, let alone how to use metasearch tools, offline browsers, and personal Web assistants. He had a lot to learn. Good thing he had me to teach him.

"Pull up a chair, kid, and I'll tell you the smart way to search the Web." I lit a cigarette, leaned back, and started in...

Because **no human** intervention is required, **search engines** can cover much more of the **Web** than any directory can.

Directories Versus Search Engines

WEB DIRECTORIES, like Yahoo's and Magellan's, are like card catalogs: They file everything in categories such as Sports, Entertainment, Computers...you get the picture. Once you find your topic in a Web directory, you've got a handful of key sites to start with. And that might be all you need. Most directories include brief descriptions of each site and lead you to a site's home page, but not to specific pages within a site.

In short, your average Web directory is a no-nonsense tool—it gets the job done, and quick. When you're looking for information on a general topic, a directory is the best place to start, particularly if you already know your way around it.

But Web directories cover only a small fraction of the pages available on the World Wide Web. That's where *search engines* like those found on AltaVista, HotBot, and Lycos come in. You tell the engine what you're interested in, and it finds all the Web pages it knows about that match. To keep their records current, the search engines use programs called *spiders* or *bots* that follow links from page to page, recording all or part of the contents of each page as they go, eventually casing much of the Web.

Because no human intervention is required, search engines can cover much more of the Web than directories can. But you need to know how to use them if you don't want to waste your time sifting through thousands of possibilities.

THE SEARCHER ALWAYS CLICKS TWICE

"THANKS FOR your help," the kid said. "Well, I gotta get going. How much do I owe you?"

A little knowledge is a dangerous thing, I thought. "Sit down, kid," I growled. "We've barely cracked the ice here.

"The search engines and directories on the Web are powerful, but they're blunt instruments—without a good search strategy and carefully constructed queries, you can waste a lot of time. Here's how you go about it."

Stake Out the Subject

IF YOU'RE LOOKING for general information, start with a Web directory. I use Yahoo, because it's got a lot of material and I'm familiar with the way its categories are organized—but you might prefer Magellan, or maybe the A2Z directory in Lycos.

On the other hand, if you're looking for a specific concept or a phrase, like *Maltese Falcon*, or something that's not easily categorized, like *bulletproof vests*, the Web directories won't be much help. You've got to use a search engine.

You'll likely need more than one, since the same query gives different results from engine to engine. I like to start with AltaVista, since it covers a lot of the Web, and then try Infoseek Ultra (http://ultra.infoseek.com)—a new version of Infoseek—because it gives results right away. See "The Simple Art of Searching" for details on the major search engines and Web directories.

Zero In on Your Target

WITH SEARCH ENGINES, take your time and do the job right. If you give some thought to your queries, you'll get better results. Try entering a handful of words or a phrase related to your topic, like *san francisco hotel* if you're looking for a place to flop when you're in the City by the Bay.

The more specific you can be, the better. Don't worry about redundancy—synonyms can help narrow the field of your search. Leave out nonessential words like prepositions and articles (*of, to, and, the,* and so on)—most search engines ignore them anyway.

Say you're looking for the inside skinny on the Whitewater scandal. Don't enter the query *whitewater*—you'll find yourself swamped with ads for whitewater rafting expeditions. The query *whitewater clinton bill hillary real estate* gets you what you want.

Work the Combinations

IF A SEARCH SITE returns no hits or too few, your query may be too narrow—or it may use the wrong terms. Try another query with fewer words, or one with different, less specific words. *Covert surveillance* takes you nowhere? Try *spy* or *stakeout*.

If the search engine returns hundreds or thousands of hits, your query is probably too broad. If you don't find what you want in the first two or three pages of results, stop. Try again with more specific words or more restrictive query options. Instead of just *detective*, try *sam spade humphrey bogart*; see "Smooth Operators" for tips on creating sophisticated queries.

Don't be afraid to try different search engines. Often the same query on other engines will turn up completely different hits.

FAREWELL, MY BROWSER

"YOU MEAN I HAVE to enter queries again and again?" The kid winced. "Isn't there a better way?"

He was catching on. "Sure," I said. "You don't have to do all the footwork yourself. That's why they invented computers." I poured a shot and filled him in.

Once you've tapped out the directories and search engines, there's a whole lineup of Web pages and software tools that can help sniff out what you need. They fall into three groups: *metasearch tools*, which submit the same query simultaneously to several engines; *search assistants*, which help you manage searches more efficiently; and *offline browsers*, which check Web pages and download them if anything's new. ▶

The Simple Art of Searching

One search site doesn't fit all, so here's a summary of what each major search engine, metasearch site, and directory is good for.

SEARCH SITE	URL	Summary	Pro	Con
All-In-One Search Page	http://www.albany.net/allinone/	A huge collection of search and reference tools gathered on one page.	If it's a search tool, it's probably here.	Page can be hard to use due to its length; you can submit only one query at a time.
AltaVista *	http://www.alta-vista.com	One of the largest and fastest search engines around.	Fast; large index returns many hits; most-sophisticated options for advanced searching.	Poor relevancy ranking.[1]
DejaNews	http://www.dejanews.com/	Most sophisticated Usenet search engine.	Lots of options with Power Search; useful filters for refining searches.	Boolean search syntax only a C++ programmer could love.
Excite	http://www.excite.com	Fast, big search engine with site reviews and travel guides.	Concept search technology does good relevancy ranking; good personalization options.	Site reviews cover less of the Web than Yahoo or Magellan.
Eye on the Web	http://www.eyeontheweb.com	Web directory with an attitude.	Can be personalized; attractive graphics.	Thin on content—few sites compared to other directories.
HotBot	http://www.hotbot.com	Very fast using Inktomi search engine technology.	Speedy; clean interface; point-and-click construction of advanced queries.	Relatively small index; creating complicated searches is laborious.
Infoseek	http://www.infoseek.com	Easy-to-use search engine, plus Web directory with site reviews.	Wide scope; many helpful auxiliary tools; custom news page through InfoSeek Personal.	Doesn't return as many hits as other search engines; cluttered interface.
Internet Public Library	http://www.ipl.org	A public library for the global village.	Reference desk staffed by actual humans who answer research questions for free; helpful FAQ file.	Slow; graphics-intensive pages.
Lycos	http://www.lycos.com	One of the first search engines on the Web, it has been surpassed by AltaVista and Excite.	Large index covers much of the Web; A2Z directory lists and reviews many sites.	Slow; hits are often out-of-date.
Magellan	http://www.mckinley.com/	Family-oriented Web directory and search engine.	Lots of reviewed and rated sites; green light icon indicates sites acceptable for minors; available in French and German.	Slow; limited advanced query options.
MetaCrawler	http://metacrawler.cs.washington.edu:8080/	Fast search-consolidation engine.	Rapid searches; easy-to-read hit summaries.	Not as comprehensive or as configurable as SavvySearch.
SavvySearch *	http://www.cs.colostate.edu/~dreiling/smartform.html	Search consolidator that simultaneously submits your query to several search engines.	Many options for refining searches; clever system for querying related groups of search engines.	Can be slow; limited to 50 hits per search engine.
Spider's Apprentice	http://www.monash.com/spidap.html	Useful guide for beginning searchers.	Detailed how-to's; news and evaluations of search engines.	Not a search engine itself; text-heavy.
WebCrawler	http://www.webcrawler.com/	Search engine plus site reviews.	Easy to use; relatively fast.	Smaller database of sites than other search engines.
WiseWire	http://www.wisewire.com	Innovative agent that uses artificial intelligence technology to find sites based on your preferences.	U-Zines present custom content and use your feedback to return more-relevant hits.	U-Zines are hard to configure; agent needs time to "learn" your preferences.
World Wide Web Virtual Library	http://www.w3.org/vl/	A volunteer effort to organize the World Wide Web by subject, with an academic bent.	Where else can you find authoritative link lists on topics like solar aeronomy or mycology?	No search engine; patience required when navigating subject catalog.
Yahoo	http://www.yahoo.com	Web directory combined with full-text Web searching from AltaVista.	Comprehensive category listing; easy to search.	Links aren't always up-to-date.

* Best Bet

[1] Relevancy ranking determines the order in which search engines display results. Pages containing the most frequent occurrence of the search words are ranked highest and displayed first. More-sophisticated relevancy methods, such as the use of synonyms, are available on very few sites.

Metasearch Tools

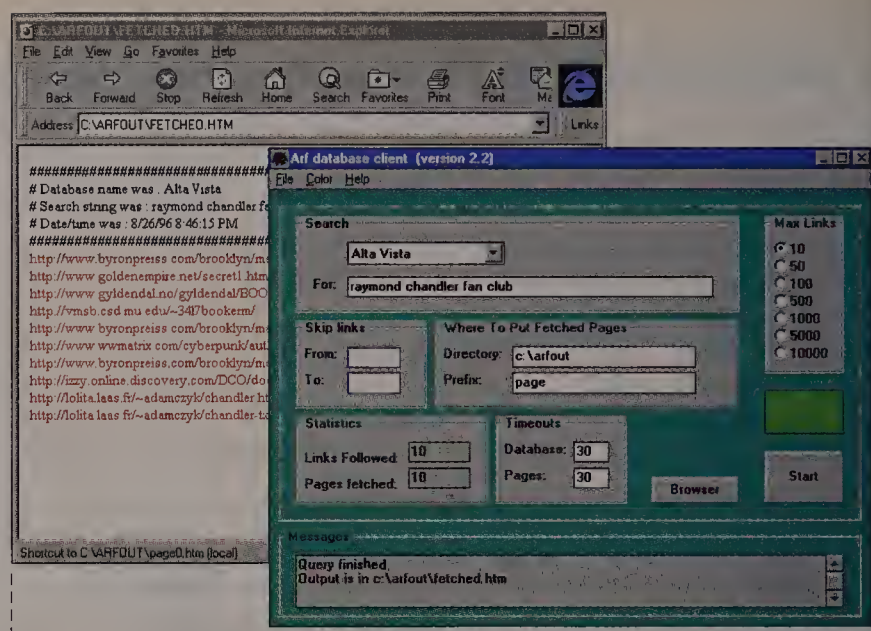
TIRED OF POUNDING the pavement? Instead of sending a query repeatedly to different sites, use a metasearch tool—a Web site or a program that submits your query to several engines simultaneously, then rounds up the most likely suspects on a single page.

One of the best Web-based search consolidators is **SavvySearch** (see "The Simple Art of Searching"). With SavvySearch, you enter your query and specify search options, such as how many hits to return from each search engine and how to display the results.

Once you've entered your query, SavvySearch submits it to three search engines that contain the kind of information you told it you're looking for. Then it collects all the results on one page. At the bottom of the page is a clever toolbar that allows you to submit the same query to different sets of search engines. It's a quick and convenient way to run searches on many engines. Best of all, it's free.

On the downside, SavvySearch limits you to 50 hits per search engine, and it can often be slowed by network traffic. For comprehensive searching, you may want a PC-based assistant, such as FastFind (read on).

An alternative to SavvySearch and similar sites is a metasearch program, such as Bitsafe Computer Services' **Arf** (http://www.execpc.com/~bitsafe/arf). Arf is a stripped-down, inexpensive ($20) utility for automating searches and consolidating the results. Its straightforward interface lets you specify a query, a maximum number of hits (up to 10,000), and a search engine (you're limited to AltaVista, DejaNews, Infoseek, Lycos, and WebCrawler). Click on the *Start* button, and Arf returns a simple, unsorted list of hits; in addition, it downloads the pages that each hit links to. To perform more than one query simultaneously, you can run several copies of Arf at once.

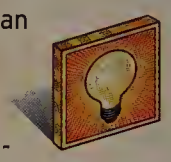


ARF, A $20 METASEARCH UTILITY, lets you specify a query, a maximum number of hits, and a search engine, such as AltaVista.

For a few dollars more, the ForeFront Group's $70 **WebSeeker** (http://www.ffg.com) offers many additional options, such as sorting the list of hits alphabetically. WebSeeker queries as many as 20 Web and Usenet search engines simultaneously and compiles a list of hits that you can sort or search. WebSeeker can be somewhat slow, but it has a substantial amount of querying power to assist the Internet sleuth. ▶

HOT TIPS — BROWSERS

■ **Odd Characters.** If you're tired of typing out Boolean operators, you can use symbols instead: & (ampersand) instead of AND, | (the pipe character) instead of OR, ! (exclamation point) in place of NOT, and ~ (tilde) for NEAR. For example, type *bogart ~ bacall* instead of *bogart NEAR bacall.*



■ **Looking for Images?** AltaVista can search for text in an HTML <image> tag. The query *image :comet.jpg* will return any page referencing a file called 'comet .jpg' in an image tag—and, with a name like that, it's a good bet that file will be a picture of a comet.

The Inside Sources

Want the scoop on a particular subject? Check out these highly specialized sites. You can find links to these and other search sites on PC World Online's customizable PersonalPage, **http://www.pcworld.com/personal.**

CARS AutoWeb Interactive **(http://www.autoweb.com/)** Let you fingers do the tire-kicking. AutoWeb offers a vast collection of ads for new and used automobiles, and it's all free. You can even post an ad free of charge for a car you want to sell.

COMPUTERS Computer Desktop Encyclopedia **http://www.currents.net/resources/cyclo/cyclo.html)** From the Algol language to ZIF sockets, everything you ever wanted to know about computers, including jargon and historical trivia.

FILM Internet Movie Database **(http://us.imdb.com/search.html)** Who said, "Just put your lips together...and blow," and in which movie? This trivia database lets you search by movie title, cast, director, even crew members. Or vote on your favorite films. *(Give up? It was Lauren Bacall. Go to the Movie Database to find out in which movie she said that.)*

GOVERNMENT The Zipper **(http://www.voxpop.org/zipper/)** Mad as hell and don't know whom to blame? Find your local representative on The Zipper (Zip code-based search), including, phone number, fax, and even e-mail address.

HEALTH The Virtual Hospital **(http://vh.radiology.uiowa.edu/Misc/Search.html)** Find descriptions of all known ailments, possible treatments, and even an occasional X-ray image.

EDUCATION CollegeNet **(http://www.collegenet.com)** Looking for a college you can afford in a climate you can tolerate? CollegeNet will find schools in the United States that offer your preferred major.

LAW Legal Information Institute **(http://www.law.cornell.edu/topics/index?)** Can Microsoft trademark the word bill? And is the Bill of Rights just a bill of goods? Find these and other topics, exhaustively cross-referenced and linked, on the Cornell Law site.

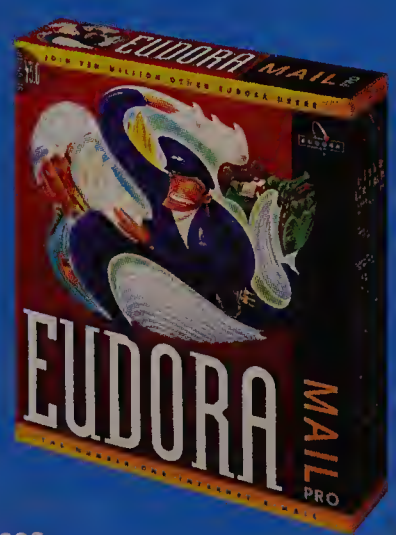
TRAVEL Fodor's Know Before You Go **(http://www. fodors.com/know.html)** All the info you need for your next trip, including weather conditions, State Department advisories, and many other resources.

YELLOW PAGES BigBook **(http://www.bigbook.com)** Complete listings, by area, for the entire United States—including maps you can zoom into. —Yael Li-Ron

$10 Holiday Rebate
Nov. 15, 1996, to Jan. 15, 1997*

In the time it takes to read this ad, you could get 25 e-mails.

(Let's talk filters.)



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Best managed PC.

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[1]In Canada, call 1-800-387-3867. *Average U.S. street price. Monitor not included. **Other capacities available. HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11; or Win OS/2 or Windows NT included. [1]First year, on-site, 24-hour, next-day service. Second and third year, return to dealer. Microsoft, MS-DOS, Windows and Windows NT are U.S. registered trade Microsoft Corporation. Pentium and the Intel Inside logo are registered trademarks of Intel Corporation. OS/2 is a registered trademark of the International Business Machines Corporation.
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PC MAGAZINE EDITORS' CHOICE

February 20, 1996
HP Vectra XU 6/150

The ultimate PC.

- Intel Pentium Pro 150, 180 or 200 MHz processor with 256KB integrated cache
- Supports dual processing with secondary Pentium Pro socket
- 128-bit high-performance memory architecture
- 16–32MB ECC DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion slots
- PCI integrated Ultra SCSI Fast 20 interface with 20MB/s throughput
- 1,000MB** SCSI-2 high-performance hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- 10Base-T/100VG AnyLAN selectable PCI NIC with up to 100 Mb/s throughput
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT® 3.51
- Free three-year limited warranty for parts and labor[1]

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HP Vectra XU

Exceptional performance and expandability at an affordable price.

- Intel Pentium Pro 150 MHz processor with 256KB integrated cache
- 128-bit high-performance memory architecture
- 16MB DIMM memory standard, expandable to 256MB with 8 DIMM memory expansion sockets
- 1,000MB** Enhanced-IDE hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2® Warp
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Helpful hint:

Rip out and pin up next to Compaq and IBM ads.

A little comparison shopping will quickly show you that HP puts the best prices on the most impressive PCs. One standout is the network-ready Vectra XM. It's configured for the most demanding networks with LAN Remote Power, Super-fast LAN install and HP Vectra Op-Center for more effective remote management. Every Vectra will outshine the competition when it comes to features and price. From the Pentium® processor-based PCs to the dual Pentium Pro processor-based HP Vectra XU PC. For more information or the name of your nearest HP reseller, call 1-800-322-HPPC, Ext. 1704.[1] Or visit us at http://www.hp.com/go/vectra.

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The world's full of **search assistants,** and most of them aren't worth a **damn.**

Search Assistants

A METASEARCH TOOL can save you the trouble of visiting every search site yourself, but you still face the problem of sorting through too many (or not enough) hits. The solution is search assistants—programs that enhance, augment, and help you keep track of your searches. Some of these tools stake out the Net for you, running the same queries again and again and notifying you only when something new turns up.

Between you, me, and the rats in the wall, the world's full of these search assistants, and most of them aren't worth a damn. Each takes some time to learn, so choose with care. I'll clue you in to one of the easiest, and two of the most powerful.

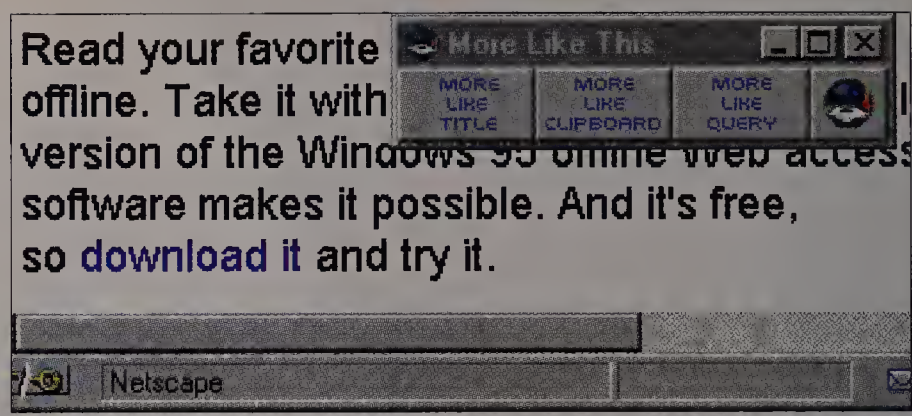
One of the dandiest search assistants is the $35 **More Like This,** from Knowledge Discovery (http://www.morelikethis.com). It's a simple toolbar that floats on top of your browser. You use it to run sophisticated queries quickly and easily: Just click on the *More Like Query* button, enter the word you're looking for, and click *OK*. More Like This submits the query to the search engine you choose and opens the results page in your browser.

Better yet, you don't need to learn any search syntax. More Like This translates your query into something the search engine can use. You can also click on the *More Like Title* button to submit a query based on the title of the Web page you're currently looking at (much like the More Like This option offered by the unrelated Excite search engine). If the page's title is 'Surveillance Tools,' for example, More Like This may take you to other sites where you can find information on snoop merchandise. You can also copy text from any application to the Clipboard, and click on *More Like Clipboard* to submit that text as a query.

More Like This also offers special concept searches, which automatically amplify your queries with related words to help zero in on relevant sites. If you enter the word *bogart* and select a concept search, More Like This may augment your query with words such as *humphrey, maltese, bacall,* and so on.

More Like This is a minimalist tool that stays out of the way until you need it. For a heavier-caliber weapon, try Symantec's $49.95 **Internet FastFind** (http://www.symantec.com), a collection of several useful utilities for finding and managing Internet information. As a metasearch tool, FastFind collects all the results on a single page, which you can view in your Web browser, sorting them by relevance or by Web site. Other utilities from FastFind's main menu can find files and download them from FTP sites, notify you when Web sites change, and search the Web for updates to your system's drivers and installed programs.

Quarterdeck's new $49.95 all-in-one search tool, **WebCompass 2.0** (http://www.quarterdeck.com), is in the same league. In fact, WebCompass has more features than this town has crooked cops. The beta version I checked out looks pretty good. WebCompass 2.0 gives you folders for organizing your searches by topic and for managing the Web pages you're interested in. It monitors those pages for changes, and its *agents* run your queries for you at scheduled times, notifying you if anything's new.



MORE LIKE THIS is an easy-to-use toolbar search assistant—it handles search syntax for you and can even do concept searches.

Offline Browsers

ONCE YOU'VE FOUND the pages you're interested in, you'll probably want to keep an eye on them. But only a sucker would visit every one of those bookmarks every day, looking for changes to each site. That's where offline browsers come in.

Offline browsers download and sort entire Web sites, including their links, or just certain pages. You can also use them like search assistants to run queries again and again. Just set a standing query (such as *the weather in Malta*), and that's it.

Some offline readers let you read news or other announcements; others function as research tools. Like search assistants, some are more trouble than they're worth.

If you're short on scratch, you'll love **FreeLoader 2.0** (http://www.freeloader.com). It's a free program that integrates with Netscape Navigator or Internet Explorer to download sites and topics. It lets you schedule the downloads so you can avoid the Net's peak hours. In return, you have to put up with the ad banners alongside its toolbar, but that's a small price to pay. ▶

HOT TIPS — BROWSERS

■ **Use Plain English.** Excite is designed to handle conversational sentences well, so queries like "Where is a good Italian restaurant in New York City?" or "learn how to speak Chinese" can be surprisingly effective.

■ **Find Quote Sources.** To find sources for short quotations, such as, "That which does not destroy me makes me stronger," just enter the quote into Excite. It's all right if you don't get the quotation exactly right—there's a good chance that the results pages will tell you where it came from and give you the correct wording as well.

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let the environment adapt to you.

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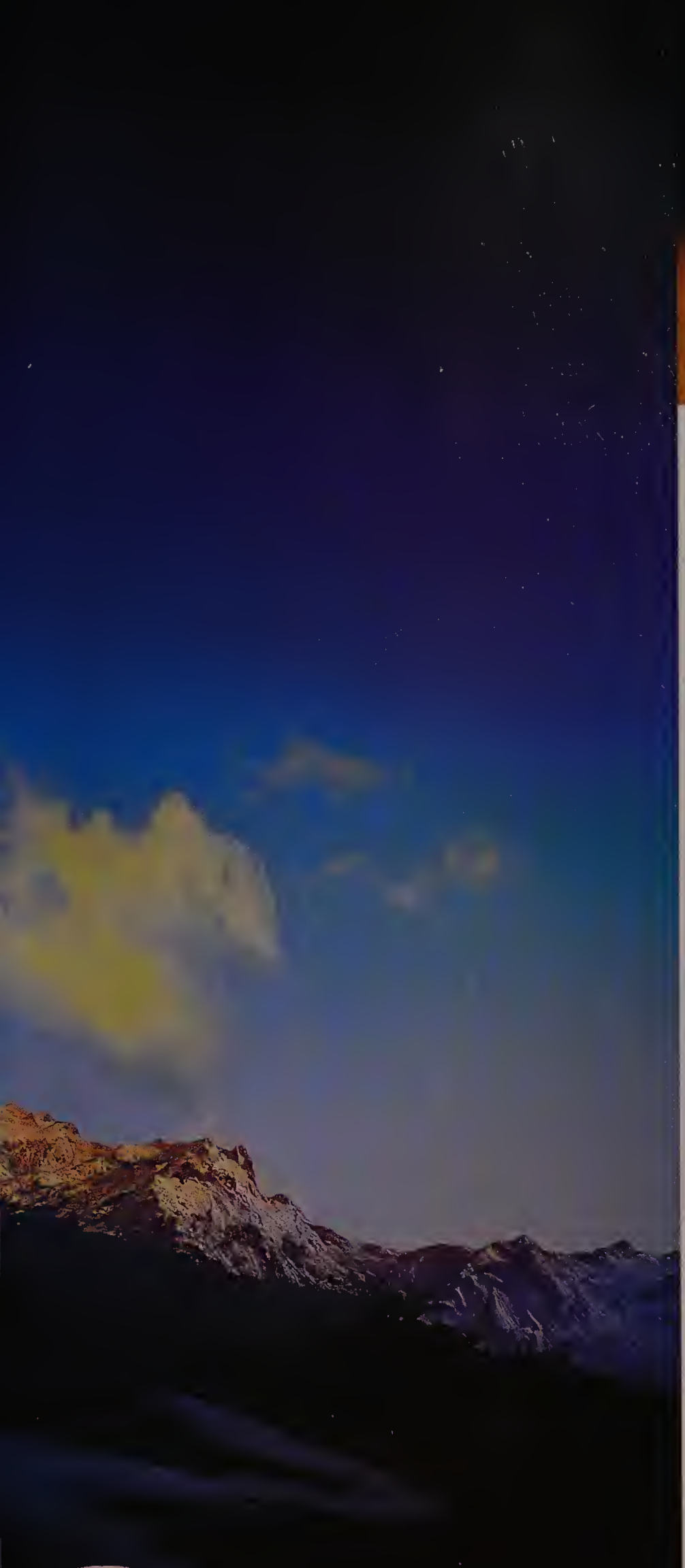

To prevent circumstances or surroundings from getting in your way, we created the new TravelMate® 6000 series. An unprecedented 6-way modular bay delivers optimum storage and memory capabilities, thus offering greater flexibility to work when and where you choose. With a trim 5.9 lb. frame illuminated by a noticeably brighter, more energy-efficient screen, it's ideally suited to even the most unusual locations. The TravelMate 6000 series is also fully supported by our new line of livegear™ accessories, including a wide range of optional docking stations. All told, it's the perfect opportunity to do something highly out of the ordinary.

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TEXAS INSTRUMENTS

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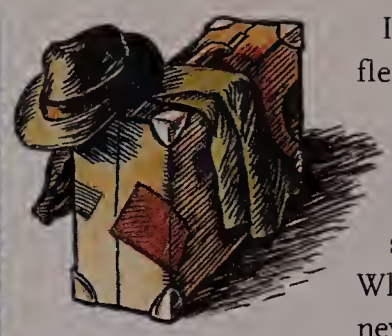

Don't unpack: **Ninety percent** of everything on the Web **isn't even worth** the time to download.

In the same vein, but offering less flexibility, is **PointCast** (http://www.pointcast.com), which delivers news on your favorite topics, using a special Windows screen saver to show you the headlines. While you can choose what kind of news you want to see (business, political, financial, sports) and how frequently you want that news updated, you're limited to the menu of news choices that PointCast provides. It's mainly just a nice way to scan the headlines, not a tool for finding specific information quickly. PointCast is free.

FirstFloor's $24.95 **Smart Bookmarks 2.02** (http://www.firstfloor.com) is billed as an enhancement to your browser's bookmarking feature; however, it's really a separate program that not only manages bookmarks but also downloads Web pages for offline browsing. It takes a little time to learn how to use it, but the effort pays off. Once you've created a bookmark for a site or a query that you're interested in, Smart Bookmarks monitors the site for changes. When there is one, the program tells you—and you can tell it to download that page and the pages it links to.

If you need a more powerful offline browsing utility, try Open Market's $29.95 **OM-Express** (http://www.openmarket.com). Among these utilities, this offline browser is the easiest to use, and it comes with a simple, clean interface and a straightforward quick-start guide. OM-Express shows Web pages' original URLs in your browser even when they reside on your system.

Want to test out the latest agent technology for free? Empirical Media's **WiseWire** (see "The Simple Art of Searching") is a Web-based agent that learns your preferences as you use it, presenting increasingly well honed selections each time you return. ▶

HOT TIPS — BROWSERS

■ **Eliminate Irrelevant Words.** While Lycos doesn't support Boolean searches, you *can* use the minus sign (–) to refine your searches. Words with the minus sign are less likely to appear in the list of query results. For example, enter the query *business -monkey* if you want to find out about business, but not monkey business.

■ **Find Whole Words.** Lycos treats an entry as a substring as well as a complete word. If you enter the word *graph*, Lycos will search for *graphs, graphics,* and *graphite*. To limit Lycos to the exact word you entered, put a period (.) at the end of the word.

Smooth Operators

Boolean operators—AND, OR, NOT, and a few others—are the meat and potatoes of most Web search engines. They help you combine search terms to include the information you want and exclude all else. Here's a rundown of the most common query operators and how to use them. Search engines vary, so check help files before submitting elaborate queries.

OPERATOR	Function	Example	AltaVista[1]	Excite	InfoSeek	Lycos
+ (plus sign)	Marks words that *must* appear in each Web page on the query results list. If there's no plus sign, the word is considered a request, not a requirement.	The query +falcon maltese peregrine will return only pages mentioning falcons—and some of those may include the words *maltese* or *peregrine*.	●	●	●	○
– (minus sign)	Marks words that *cannot* appear in any Web page on the results list. Use this to exclude pages containing a particular word.	The query "orient express" -train will return pages about the Orient Express, but not the train. (You'll be surprised!)	●	●	●	●
" (quotation marks)	Indicates exact multiple-word phrases. If you don't enclose a phrase in quotation marks, the search engine will assume it's a list of separate query terms.	The phrase "read my lips" will return a list of Web pages containing that exact phrase, whereas the query read my lips returns pages containing the words *read, my,* and *lips,* not necessarily in that order.	●	○	●	○
AND	Connects two search terms, both of which *must* appear in each Web page on the results list.	To find out if Hammett and Chandler ever collaborated on a story, use the query hammett AND chandler. Note: Most search sites assume this operator by default, so typing hammett chandler will yield the same list.	●	●	○	○
OR	Connects two words, at least one of which should appear on each Web page returned by the query.	This is a good way to connect synonyms or alternate spellings, as in the query sleuth OR detective.	●	●	○	○
NOT	Is used much like the minus sign to exclude words. You must use it with AND or OR.	The query bogart AND NOT casablanca returns pages containing references to other Bogart films.	●	●	○	○
NEAR	On AltaVista, specifies two words that must appear within ten words of each other in every document on the search results list. On InfoSeek, put [ ] (square brackets) around the two words for a similar effect.	This can be a useful way to search for names. The query hillary NEAR clinton will return documents containing *Hillary Radham Clinton* as well as *Hillary Clinton* and *Clinton, Mrs. Hillary.*	●	○	●	○
() (parentheses)	Groups sets of advanced query operators together.	The query detective and (marlowe or spade) will turn up Web pages about one or both detectives.	●	●	○	○
* (wild card)	Symbolizes any amount of letters or numbers on most search engines.	Use the query term elvi* to find out about Elvis, the many Elvises of Las Vegas (including The Flying Elvises), and Elvira, Queen of the Night, among others.	●	○	○	●[2]

[1] Supports the + and – operators only on its simple query screen; AND, OR, NOT, and NEAR are supported only on the advanced query screen.

[2] Wild-card character is $ (dollar sign).

Note: HotBot supports advanced queries similar to those described here, using its query form rather than operators.

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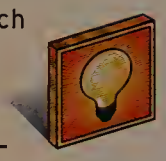
However, it's slow and awkward to use. It's an interesting glimpse of the future of online searching, but it's not an effective search tool yet.

If you're serious about online research, take a look at **Folio Retriever 2.1** ($39.95, http://www.folio.com), an offline program that builds on the Folio Views infobase format, dumping the contents of downloaded sites into fully searchable infobases that you can annotate and share with others. Retriever includes a fully functional version of Folio Views 3.1, though it's limited to importing HTML pages. FolioRetriever's power lies in letting you handle the data once you've downloaded it.

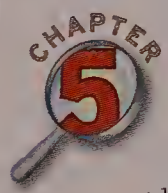
BROWSERS

HOT TIPS

■ **Find Specific Information.** In addition to Web and Usenet searching, Infoseek offers options that let you search for company information, e-mail addresses, recent news, and Frequently Asked Question files. Just select the directory you want to search from the drop-down list on the main query page.



■ **Keep Your Caps On.** To search for proper names, capitalize them when entering your query: *Hammer,* not *hammer.*



THIS DATABASE FOR HIRE

THE KID GOT OUT of his chair. "Well, now I really better get going." he said. "Thank you—you've been a great help."

"Not so fast," I growled. "There's one more angle to go into."

"But you've told me all I need to know!" he said. "Now I'll be able to find all that information my boss wanted."

It was time to break the news to him. "Ever heard of Sturgeon's law?" He shook his head. "'Ninety percent of everything is crap.' If that's true of anything, it's true of the Web. Ninety percent of everything on it isn't even worth the time it takes to download.

"Sure, real gems of information are buried there, and everything I've told you today will help you zero in on these. But the really important stuff that will give your business a competitive edge—like high-quality market information or financial data—costs money." I paused. "It all depends on whether or not you're willing to pay the price."

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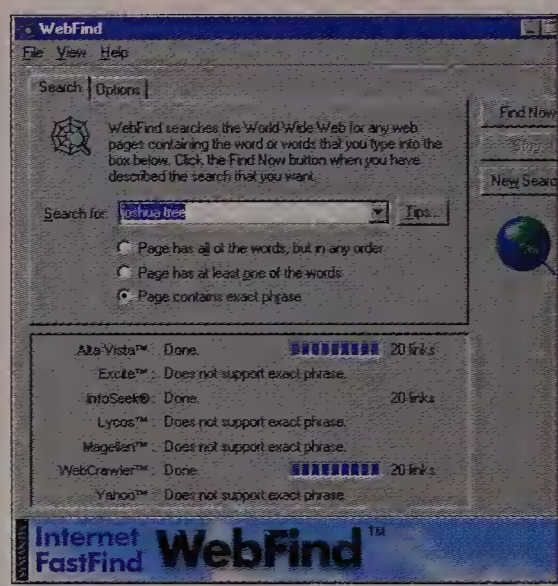
Subscriptions are $24.95 per month; the first month is free. There are additional pay-per-view charges for specific types of information, such as Standard & Poor's company profiles.

If it's financial data you're after, you can hardly do better than **Quote.com** (at—no surprise—http://www.quote.com). Quote.com has an abundance of free stock quotes and financial information for the savvy investor; you only need to register at the site to gain access to a wealth of information. For yet more wealth, you can pay subscription fees (starting at $9.95 per month), and Quote.com will throw in additional news stories, customizable stock charts, a portfolio tracking service, and historical stock data.

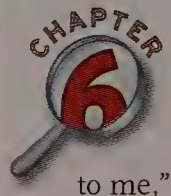
To get real depth on a company, an industry, a legal matter—almost anything on record—the best source is Knight-Ridder's venerable **Lexis-Nexis** service (http://www.lexis-nexis.com). Lexis, a huge archive of laws, cases, and public records, has been around since 1973. Its companion service, Nexis, provides access to the full-text archives of thousands of newspapers and magazines, a news clipping service, and more.

The catch? Lexis-Nexis costs more than a big night on the town. Subscriptions are $100 or more per month, with additional fees for using many databases. But if your business needs access to this kind of information, it's well worth the expense.

For general background information on almost any topic, Encyclopedia Britannica's **Britannica Online** (http://www.eb.com) provides well-researched, well-written articles that include full bibliographies—a handy feature if your next stop is the local public library. Individual subscriptions aren't cheap: It'll cost you $14.95 per month, or $150 per year plus a one-time $25 registration fee, but that still beats the two-ton book set handily.



INTERNET FASTFIND, from Symantec, is a heavy-duty tool kit of Internet search utilities.



SORRY, WRONG DETECTIVE

"YOU'VE BEEN A BIG help to me," the kid said. "How can I ever thank you?"

"Don't mention it," I replied. "Just leave your money on the table."

This is a good business, I thought as I fingered the C-notes. But it couldn't last. Someday—maybe not today, maybe not tomorrow—I knew I'd be out of a job, replaced by computerized agents and artificial intelligence.

But until then, I was going to be living in Fat City—and I needed somebody to celebrate with. I fired up my browser and looked for the e-mail address of an old flame.

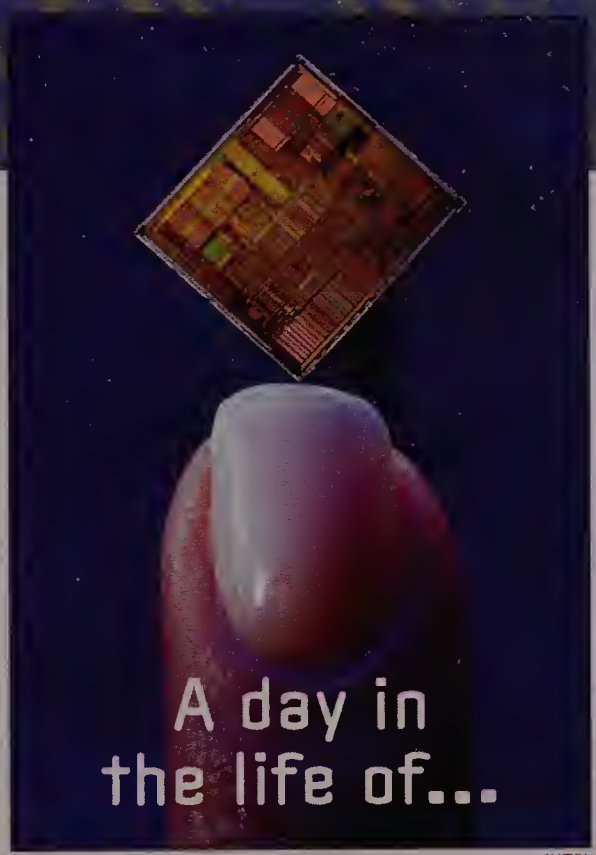
Unfortunately, there were several Jessica Fletchers in the Four11 directory (http://www.four11.com), so I picked one at random and sent her e-mail. She replied within the hour. Sounds like a great lady, and a soul mate to boot: She's an amateur detective. This could be the beginning of a beautiful friendship.

Find files mentioned in this article, including a customizable search page, on PC World Online (http://www.pcworld.com/dec96/bigseek). Dylan Tweney (dft@pobox.com) is an associate reviews editor for InfoWorld. *Yael Li-Ron is senior online editor of PC World Online.* ■

THE 25TH ANNIVERSARY OF THE MICROPROCESSOR

The Ultimate Tool of Invention and Imagination

Stephen Brand



INTEL

..a typical merican amily

t the Jacquards. For this family, today is orkday, a school day, a day of discovery of sharing new experiences, trying new s and "inventing" their lives together. y are fictional, of course, but this is not nce fiction. Unlike any generation be-, they—and we—have a tool, an inven-, that affords us extraordinary opportuni-to create, to collaborate and to connect family, friends and colleagues.

The youngest child, Edmund, is showing grandparents an imaginary bird he creat-or a school project—even though they n Guatemala. His older brother, John, s asking his mother, Marie, for help with esearch on volcanoes. She can take a nent from work to offer a suggestion. , a junior in high school, reminds her fa-, Joe, that she's got basketball practice afternoon. He gets her message at his e office.

As you will see, all of these activities—many other aspects of everyday life—made possible by an invention that has lmost transparent presence and touches ally everyone. That instrument is the , incredibly powerful information-han-g engine of innovation: *the microprocessor*

Unlike many other technologies that n become obsolete, the microprocessor increased in value in the quarter century e its invention. It has been improved by onential leaps of computing power, fall-ust as rapidly in cost and has been put to more uses.

The microprocessor is now ubiquitous and often unnoticed—since 1986, over 1.5 billion have been shipped from factories around the world. Sheer numbers, though, do not express what is most important about this elegant device: the human dimension. It is unlocking individual creativity, building new structures of productive collaboration, punching through barriers of time, space, culture and communication. It is adding new dimensions to our lives.

Plugged In

If it only processed data as a computing device, the microprocessor would yield great social benefits. We would get the answers we need to quantifiable questions far more efficiently. But the capacity of this invention to improve and even save our lives is beginning to be realized as we connect the desktop or portable computer to other technologies. Plug in the laser-read compact disc player, fiber-optic and cellular communications, digital camera, CT scanner, etc. The possibilities are endless, and the results are, happily, unpredictable.

Certainly the inventors of the microprocessor did not predict, at its birth in 1971, how it would be entwined in our everyday lives, from toys to car phones. The "personal computer" did not yet exist.

Three engineers (Dr. Marcian "Ted" Hoff, Jr., Stanley Mazor and Dr. Federico Faggin) at a small company in California called Intel were working on a specific problem: a customer wanted to make a programmable calculator. Elaborating on the existing way of custom-building electronic circuits would have produced a complicated, costly product. Instead, the Intel inventors created a new structure: a single, programmable processor linked to a memory device that would tell it what to do. It was simpler, less expensive and far more versatile. For this historic breakthrough they were inducted this year into the National Inventors Hall of Fame.

Product designers and inventors around the world soon had an amazing new tool in their workshops: affordable, compact computing power. The proliferation of the chip had begun, and it's been accelerating ever since.

In this special report on the microprocessor's impact on our world, we'll take a close look at how people are using this device to work, to learn, to communicate, to have fun. We'll hear from the *real* experts, hometown innovators across America, discussing how this technology is reshaping business, medicine, education and the arts.

We'll spend a day with the "virtual" Jacquard family, who are using today's computers and the many technologies linked to them to do the kinds of things families have always done. Yet, this is genuinely new: a sophisticated invention, a tool for the imagination, for all of us to use.

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COMPUTERS SET MUSIC BACK 400 YEARS!

By Thomas Dolby

Throughout history, music and technology have often gone hand in hand: the pianoforte was a technological breakthrough 200 years ago. The electric guitar transformed popular music in the 1950s. Today's astonishing technological advances will have a huge effect on the way we all experience music.

I make my living as a musician, my good fortune due largely to a single song I released back in 1981 entitled "She Blinded Me With Science." It was a big hit, yet there are things about that performance that have always bugged me. Unfortunately, once the master was struck I became stuck with it for eternity.

If I had been a professional musician in the 16th century, I'd have sung my song at noon in the town square, and again in the evening for the king and his court. My performance would have varied each time, depending on the mood of my audience. If they threw down farthings, I might have milked the last chorus for all it was worth; if they pelted me with rotten tomatoes, I'd probably have changed the lyrics on the spot! So my music, circa 1596, would have been highly "interactive" but not exactly "mass market."

In the 20th century, the gramophone allowed me to record my song, and the radio broadcast it to millions of people who passively listened. Thanks to technology, we musicians became "mass market" but totally "noninteractive."

As we approach the 21st century, microprocessors are changing everything. My home computer has replaced the recording studio. Soon I will no longer need radio stations or TV networks, because anyone can go online and hear my music commercial-free (www.tdolby.com). I don't even need stores to stock it; people can download it directly from the Net.

This means the public no longer needs to pay $15 for a CD just to hear one hit song. And instead of getting paid 10% of sales by the record company, I can distribute my song instantaneously all over the world for whatever price the market dictates—and I keep 100%. I can perform the song live on the Internet or upload a new version, and the public can remix it or "jam" along in their own homes. The microprocessor has finally closed the gap: my music is both "interactive" and "mass-market," the best of both worlds.

IMAGE BANK

Morning

When Edmund gets his turn at the computer in his third-grade classroom, he calls up his science project: a bird he has drawn and colored on-screen. The assignment is to invent a new creature and design the ecological niche where it lives. What does it eat? Where does it nest? What is its name?

Edmund switches to an encyclopedia on CD-ROM. From the auk to the yellowthroat, birds sing and display their plumage as he traces their migrations across continents. "I'll show Grandma and Grandpa my bird," he thinks. "They're on a trip, but that won't matter." When he connects the computer to the Internet, his digital bird flies to their electronic mailbox, which they are able to access through the phone lines at their hotel in Guatemala.

At his middle school, John's study team is looking into a volcano at the bottom of the Pacific Ocean. Just east of Hawaii, a new island is being born, Lo'ihi. Describe the phenomenon, their teacher said. Predict what will happen when it breaks through the surface 100,000 years from now. With their multimedia computing power and access to data being gathered by vulcanologists in a submersible, John and his young colleagues are creating a graphic simulation of the event. The centerpiece: an undersea volcano video clip (www.soest.hawaii.edu/hvo/)!

Kay is 16 and energized by the performing arts and athletics. It's about motion, tension, expression. She feels an emerging identity—that of dancer, competitor, leader. Here, in art class, she can explore new ways of defining and communicati herself. Her work in progress is a dance ga that she calls "Hoop." She is choreographin composing music and signing costumes and props for the work, which the dance club perform, all on a com er located in the scho library. Looking at th on-line school calend to find their next rehearsal time, she rem bers she has basketba practice this afternoo She e-mails her fathe reminder that she'll b home later than usual

Kay's mother, Ma is at work in a plant that produces new m rials for manufacturing all sorts of produ The workplace has been transformed sin the company was started 30 years ago in garage. Much of the manual labor, the ro estimating that guided processes and the time-consuming paperwork are just mem ries now. Microprocessors control syster to eliminate waste, errors and pollution; maintain employee records; and track in tories, orders, shipments and supplies. Portable, chip-based computers and com munications gear give people greater mo ity so they can keep in touch whether they're at their desks or not.

People in Marie's company now focus o balancing individual creativity with collabo tion for the common goal, to deliver more v ue. She's working with a team of engineers herself to find an economical way to produ new material for the auto industry. Just as au mobile tire makers can "race" a computer-ge ated new tread design on a virtual Grand Pr track, she can formulate a material and mea its properties on-screen: heat it, bend it, ba

Marie and her partners, who are scattere from Toronto to Atlanta, relay their work t one another over the company's network. They gather the latest research reports and o fer, always hoping for the unexpected revela that leads to innovation.

Along with her work-related communic tions comes a message from John at school question about volcanoes. She replies with pointer to further research. "Yes!" she says, tling herself, "that gives me an idea."

ternoon

cquard is another kind of product de-
. He is starting a business developing
onsumer services. Working at home,
s created the business plan, marketing
ials and record-keeping system on his
uter. He just sent a personalized mail-
his international network of contacts,
ut licking a stamp. His company exists
erspace: one person with an idea and
wide reach.

forwards his calls to a voice-mail sys-
nd puts on a tie. He goes to the local
copying shop, which has added a suite
deo teleconferencing, and holds a
ng with potential clients in three cities.
hankful that he didn't have to go out of
for this business trip.

om the shop, he does his banking and
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ents have been made; his new Web site
t its 100th visit; and Kay says she has
tball practice, but she'll be home for
r. Must go to the supermarket!

arie has just started her presentation
nior executives, using a laptop
ected to video projection equipment,
team members present by phone.
proposed formulation, the test-run
and the cost projections are all there
ld colors. "What if...?" someone
Her team can input the suggested
ge and show the revised results
st immediately, without the need for
one to reconvene and waste the
valuable resource: *time*.

After the meeting, Marie leaves for a doctor's appointment. There, a blood sample is analyzed and results are tabulated against past readings while she waits. She is participating in the final testing of a new pharmaceutical that was designed on a computer. The doctor invites her to sit in while he conducts a video conference call about her case with specialists at a major medical center. All the information on her case, including laboratory tests, digital images of X-rays, CAT scans and photomicrographs of cells, are in a desktop computer's memory. On the screen, the information is organized in what looks like a spiral notebook.

They connect a video conference call through the computer, and at the other end of the line three physicians begin to look at the same images and data while they discuss Marie's case. She uses the computer's mouse to select a color and draw a circle around one of her cells, and she asks a question. It's helpful in understanding their opinions and reassuring that in the corner of the screen she can see their faces, enabled by a tiny video camera mounted on each computer. With this new information, physician and patient agree on the next step.

Before heading home, Marie gets a traffic report by dialing from the laptop in her car, connecting to the traffic pictures on the local department of transportation Internet site (for example, www.ontv.com/parkway/). She changes her route home to avoid a major traffic jam, settles back for the ride and flips on her favorite CD.

Basketball practice is over, and Kay's coach is updating the notes she keeps on her

ONE IMAGES

WHY LEARN ABOUT TECHNOLOGY?

By Rocky Harris

Computer technology is helping me to achieve two of my educational goals: my students can actually experience history and economics in a meaningful way, and they are learning to appreciate and understand cultures beyond Hillsboro, Oregon.

Using the Internet, students at Hillsboro High School are able to access huge amounts of information, including research as it is being done and events as they are happening. They can engage in dialogue with experts in a specific field, and with people all over the world.

Thanks to a cooperative effort between the schools and local businesses, including Intel, we have been able to make computing technology available to our students. An e-mail server and a World Wide Web server allow students to use the Internet as a study aid, like an immense library.

Our e-mail system is linking elements of the educational process efficiently, and helping everyone, teachers included, learn more effectively. Teachers are beginning to post class assignments on their home pages. About half of our 1,500 students have on-line accounts from which they can access their e-mail and use browsers to do research. As the Net spreads, more teachers are bringing their classes to the computers to learn how they can use them.

Here are two examples: Some students had surprised one of our teachers with their depth of understanding about the issues confronting Americans during the Vietnam War. Their assignment was to author a skit on the topic. Two students presented a skit, focusing on an argument between a father and his son, that dealt with nearly every pertinent issue. While conducting research over the Internet, they had found a play about a father and his son arguing over the Vietnam War. They downloaded the play, read it and extracted the issues for their own skit.

In a science course called "Journey North," students collect data about the migrations of monarch butterflies, bald eagles, songbirds and loons. The data is then submitted via the Internet to a team of scientists who prepare summaries. The teacher incorporates them into lessons on ecology. And the students, studying the summaries, ask the question all scientists try to answer: "Why?"

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Twenty-five years ago, three Intel engineers invented the microprocessor. It was about this big, yet it made PCs possible. Today, thousands of Intel engineers are kicking around a few more small ideas.

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THE "VIRTUAL" SUPERMARKET

By Kevin Sheehan

Perhaps you're old enough to remember the milkman delivering milk to a box by your front door. When we got started in the home grocery shopping and delivery industry in 1987, we thought our business was similar: "an old-fashioned service revived with modern technology."

That technology was automated phone systems and fax machines! They seem like horse-drawn milk wagons now. Today, the phone and fax are quickly fading out in the computer-modem-based process of ordering groceries. Our company, Shopping Alternatives Inc., provides an interactive grocery shopping and delivery service made possible through the advent of the microprocessor. Customers place their orders by personal computer, the items are gathered from a climate-controlled warehouse and conveniently delivered to the customer's home.

Our ordering software allows the consumer to place the order in a user-friendly, convenient and efficient manner. A typical customer places a $100 grocery order in less than five minutes. Compare that to the time you spend waiting in the supermarket checkout line!

We began offering computer-ordering capability about a year ago, and it has revolutionized our business. Taking an order by PC versus phone or fax means pennies versus dollars in our cost. That means profitability versus unprofitability, which ultimately allows enhanced services and happier customers, because they can shop more efficiently and buy smarter.

We're preparing to launch the second version of our ordering software, which will allow customers to "virtually" shop. They'll sit in front of their computers and "walk" up and down the aisles, select products, read the nutritional information, and even sort products by price and nutritional content. For example, the computer can sort frozen dinners from the lowest to the highest sodium content. Also, it can point out product specials and coupons that, based on individual buying habits, are likely to be of particular value. What's more, the customer can shop any time, day or night — even in pajamas!

Maybe a few years from now we'll sit around saying, "Remember the old days when we used to have to go to the store to buy groceries?"

laptop. Plays, practice plans, game schedules and statistics are all on her electronic "clipboard." In her office, she has been gathering information on training methods that improve performance and decrease the risk of injury. She'll put it all together in a multimedia "chalk talk."

Evening

It's John's turn to cook dinner, so he punches a few buttons on the microwave and gets back to his video game.

Joe and Marie are checking the e-mail. There's a message from the grandparents for Edmund, and he comes running. They download a file, and Edmund opens it. "Thank you for sending us your bird picture," they write. "Here is a snapshot of a bird we saw on the shore this morning. It's not as beautiful as yours, nor as rare, but can you identify it?"

Edmund searches a CD-ROM for wading birds and finds the American avocet, which migrates to Guatemala for the winter. He'll bring this in for show-and-tell tomorrow. It gives him an idea for naming his bird.

Marie lets her messages wait while she directs John's attention away from the video game to help with his volcano homework project. And Joe has heard back from his contact in Hong Kong, where it's midday tomorrow.

It's cold tonight, and Kay is thinking about a new dance with a skiing theme. She's looking forward to working out the details on the slopes. When she finishes her algebra assignment, she checks the snow conditions at a resort a few hours away. She clicks on Lift 6, and there's a photo, taken with a digital camera that morning, of fresh powder drifting against the snow fences. She dreams tomorrow, ideal conditions.

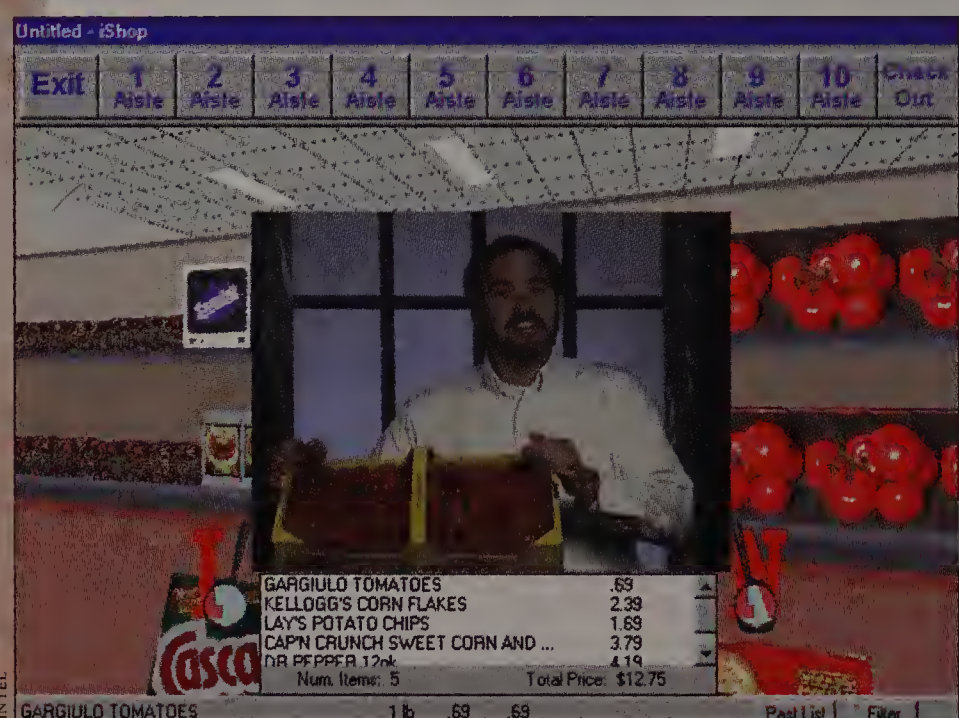
Tomorrow

In our imaginations, tomorrow brings ideal conditions for our lives. While there will likely always be difficult challenges to overcome, our imaginations continually invent improvements, innovations, advances. It's still dawn in the day of the microprocessor. Only recently has it become possible for people of all ages, backgrounds and descriptions to take advantage of its capabilities in meaningful ways: to create, to collaborate, to improve the quality of our lives.

Now billions of people, not just an elite, can invent the future, using this technology. In the years ahead, the power once found only in supercomputers will be packaged in "desktop" machines. Imagine what people will create with that kind of inventive power. Consider what's already foreseeable:

- Imaging, creating or recording things, manipulating them and communicating those images to others will become far more sophisticated and more widely available.
- Three-dimensional graphics will evolve from "photo-realistic" to "life like" as quality increases and the still image becomes animated with artificial intelligence. Children will use this technology to travel back in time on their PCs for virtual field trips to ancient Rome, Egypt or to the surface of the moon. And a wealth of 3-D "study halls" will become available on-line, each one themed to a specific topic and populated by students and teachers from around the world.

We're already seeing the unification of television, computing and telecommunications into one interactive resource for information and services (Intercast-Technology already uses the PC to blend broadcast television with Web pages). Desks are disappearing from under our desktop computers. Keyboards and screens are morphing



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A SENIOR SURFER'S FAVORITE WATERFALLS

By C. J. Flores

Several years ago, when I had just retired from the corporate world, my daughter, who is an elementary school teacher, asked me to help out in her classroom. I talked with the kids about lots of different subjects. My daughter had signed up with an Internet service provider to create an electronic school forum. It was then, while "surfing the Net," that I found SeniorNet.

There are over 20,000 members of SeniorNet, men and women, all part of what I call the third-age generation, those of us over 55. We get together on-line (www.seniornet.org) to chat, send e-mail and discuss everything under the sun — history, our personal backgrounds, politics, health care. But we can also relate to younger people. I found that what I enjoyed in my daughter's classroom was also available on-line. I discovered a group of schoolchildren who had posted questions about World War II. We started trading messages. Everybody was interacting and discussing things like blackouts and collecting cans for the war effort, the sort of things you don't find in history books.

SeniorNet also operates 90 learning centers across the country where seniors interested in computers can meet and learn a variety of computer techniques and applications. It is run by a volunteer teacher base—about 1,200 seniors. Some of us are writing novels, researching family trees, putting together family photo albums or pursuing our hobbies.

Ever since I was a kid, I've loved waterfalls. I've used my on-line friends to add to my collection of pictures and stories and names of waterfalls from all over the world. I've expanded my database to about 5,000 names of waterfalls, with accompanying stories and directions for finding them.

I was even able to publish an interactive version of my collection, "The World of Waterfalls" (www.batnet.com/infoman/waterfallsonline). It's got animation, photos and travel tips. One that ranks high on any waterfall aficionado's list is the Gouffre de Padirac Cavern, in the Dordogne valley of Bordeaux, France, where you can explore the subterranean river on foot and by boat. Come surf the waterfalls with us!

into forms better suited to our hands and senses.

At work, computers will help us build zero-pollution manufacturing plants, making better, customized products.

With gene-mapping, medical science is targeting formerly untreatable genetic disorders. No less important, the benefits of the best medical knowledge can be spread very widely and far less expensively than ever before.

Microchips are breaking down barriers to education, the arts and communication w others who have common interests. Soon there may be no language barrier. We are structuring work, school, home, art, sport everything we have been accustomed to, dating back centuries, to be more respons to our needs and values.

This invention, the creation of a few orig nal thinkers, is opening doors of opportunit but also challenging us. The microprocesso tool that *anyone* can use, helps us answer co plex questions. And it raise simple one: **Who are we?**

TONY STONE IMAGES

Stephen Brand is president Inventure Place, the National ventors Hall of Fame, a nonpr organization that celebrates America's inventors as heroes making important contribution our lives and inspiring the next generation of inventors throug educational programs. To lear more about its problem-solving abilities, call or access the Web site at: 800-968-IDEA or www.invent.org. Stephen Brand's e-mail addre StephBrand@aol.com

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www.intel.com Get free information and software—like the Intel Internet Phone—for and about PCs.

www.thepalace.com The Palace™ virtual world chat software lets you add pictures and sounds to your online chats.

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ENTERTAINMENT

www.madmind.com An "X-file"–like interactive, animated thriller exploring human dreams, visions and madness.

www.thepyramid.com An interactive soap opera full of murder, mystery and intrigue, set in a Silicon Valley software company.

www.MTV.com Mix of the latest music, animation and videos. Top 20 countdown provides steaming video clips of the hottest music videos.

www.sony.com A wide-ranging mix of the latest in music, movies, games, artists and electronics.

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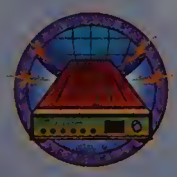


Best PCs for the Holidays

HOLIDAY BEST BUYS

WHEN YOU OPEN that big gift-wrapped box this holiday season, don't be disappointed if the PC inside isn't one of the latest Pentium-200s. If it is, you may discover that for the umpteenth year in a row, your neighbor received a hotter gift than ▶

EDITED BY BRAD GRIMES

'TIS THE SEASON: Pentium Pros like Dell's OptiPlex GXpro 200 are faster than a one-horse open sleigh.

you. This season, the hottest PCs use the slightly older, significantly faster Pentium Pro.

This month we have enough Pros on our Top 20 Power Desktops chart to start our own sports franchise. Among them is Dell's OptiPlex GXpro 200, which is vying for the top spot that Micron's Millennia P200 holds. It's superfast, easy to upgrade, and network ready. But Pentium Pros come in all shapes and sizes. Five new Pro-200s join the power ranks this month, bringing the total number of these workhorses to eight.

A PRO in your small office? Gateway's new G6-180 costs as much as a P-200, but it's faster.

Meanwhile, Gateway 2000's new G6-180, with a Pentium Pro-180 CPU, is now the fastest PC on our Budget chart.

So be careful what you wish for this holiday season: Like the P-200 versus the Pro, newer isn't necessarily better.

HO, HO, PRO

THE HIGHEST-RANKING new Pro-200 is the number seven Micron Millennia Pro200 Plus. It cuts an impressive figure with its SCSI storage system and Iomega Jaz drive, but at $4707 it isn't cheap. Right behind the Millennia Pro200 Plus is the $3249 Gateway 2000 G6-200, which has a SCSI hard drive of its own, plus a 4MB Matrox Millennium graphics card for displaying photo-realistic images at resolutions above 800 by 600.

The Gateway 2000 G6-180, which lands at number eight on this month's Budget Desktops chart, delivers a lot for the money. It's the first PC we've tested that uses a 180-MHz Pentium Pro processor. Its speed falls squarely between the average Pentium-200's and the average Pentium Pro-200's—and that's with just 16MB of RAM. Most Pentium- and Pentium Pro-200s we've tested have 32MB. But its price tag—$2384—is like that of less powerful systems.

NEW BEST BUYS

ALTHOUGH THE DELL OptiPlex GXpro 200 comes close, none of the Pentium Pro-200s can match the overall value of our new number one power desktop, the $2649 Micron Millennia P200. This month we retested the Millennia P200 with 32MB of RAM (we'd previously tested it with 16MB) to help you compare it to other power systems with 32MB. The extra memory boosts performance, but it's Micron's aggressive pricing that really pushes this system to the top—the Millennia P200 is about $300 less than a similarly configured Pentium Pro-200.

Speaking of aggressive pricing, we also have a new chart-topper on our Budget

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them. If not, ask us; see page 14 for contact information.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, monitors, modems, printers, and graphics boards we've tested. Every month we test the latest products in each category and compare them to the pool of items we've already reviewed. As new products earn places on the charts, those at the bottom drop off. Price cuts also cause chart changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? It's the sum of all our tests—both hands-on evaluations and automated speed tests. The scale is 1 to 100, so a product that scores in the 90s is generally considered exceptional, one in the 80s is among the best, one in the 70s is above average, and one that scores lower usually doesn't place.

What does the PC WorldBench score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Dell P75t configured with 8MB of RAM, a 540MB hard drive, and no secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline unit.

Where do the reliability and service and support scores for PCs come from? The reliability score and the "service" portion of the service and support score come from readers who respond to the Reliability and Service fax-back survey in each issue of *PC World*. The "support" portion of the service and support score is based on the vendor's support policies (such as length of warranty and support hours).

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For example, a budget PC that is rated "expensive" is high-priced only in relation to other budget PCs. Likewise, a power notebook rated "good" for performance is good only in relation to other power notebooks. Word scores for other categories, such as features, are relative to all desktops or all notebooks.

Where can I find the online version of the Top 100? Go to PC World Online (http://www.pcworld.com). There you'll find not only the current issue of *PC World* and reviews for the last 18 months, but some extra features you'll want to check out. For one thing, PC World Online includes reviews you won't find in print. If a product misses a chart and we don't cover it here, you can go directly to an online review by using the URL provided in each Top 100 section.

Have you ever wished you could build your own chart based on your buying criteria? Now you can, with Personal Shopper at our Web site. Personal Shopper combines your criteria with *PC World*'s current data and test results to generate customized Top 20s and Top 10s. For instance, if you want your chart to rank notebooks that have 120-MHz processors and 28.8-kbps modems, Personal Shopper will find and rank all the machines that fit your specifications.

FIT TO BE WRAPPED: Toshiba's Satellite Pro 420CDS and IBM's ThinkPad 560 P133.

list. The Dell Dimension P133v costs a paltry $1799, but it's faster than the average P-133. It's even a better overall value than the $1949 Dimension P200v, which was a budget Best Buy last month and remains a good choice. However, we list only a single system in a product line.

Hewlett-Packard lands two notable new PCs on the Budget chart. The sixth-ranked $2348 HP Pavilion 7130P is a fun, attractive home PC that will entertain the family and organize your work. The new $2170 HP Vectra VE 5/133, which ranks just below it, is designed to be a low-cost corporate PC. You should note, however, that both the Vectra VE 5/133 and the Pavilion are slow for Pentium-133 PCs. It's the quality of their design that propels them up the chart.

OUR FIRST TRUE P-150 NOTEBOOK

SOME NOTEBOOK VENDORS like to slap desktop CPUs into their portables so they can brag they're the first with a such-and-such processor. Desktop CPUs in notebooks aren't a good idea, though. They overheat, suck up too much of the notebook's energy, and wreck battery life. For instance, EuroCom's 6400T P-150, one of the first P-150 notebooks out, lasted only one hour in our October tests because it uses a P-150 desktop processor. A notebook with a mobile version of a chip is a much better deal. This month we tested Dell's $4599 Latitude XPi CD P150ST, which is the first notebook we've seen that uses the new mobile Pentium-150 CPU.

Many vendors are taking a cautious stand on the P-150 (some are skipping it altogether) because it doesn't produce much more speed than the P-133. In the case of the fourth-ranked Latitude P-150, they may be right. Its PC WorldBench score of 166 is just slightly higher than that of the average P-133 portable we've tested, and it's lower than that of Dell's own top-ranked Latitude LM P133ST.

On the other hand, the Latitude XPi CD P150ST has some great features, like a floppy/CD-ROM drive combination so you don't have to choose one over the other, and a pair of infrared ports (in front and back) to give you greater flexibility when aiming your notebook for wireless data transfer. But it's not the major improvement that we expected over Dell's LM series of multimedia portables.

Two other new notebooks on the Power chart this month are the third-ranked $4198 Compaq LTE 5250, a P-120 unit, and the sixth-ranked $4448 IBM ThinkPad 560 P133. They perform about the same, despite the fact that the Compaq uses a slower CPU, but they are considerably different systems. The LTE 5250 is a multimedia notebook with a removable CD-ROM drive and a smallish 10.4-inch screen. It's the choice for taking CD-ROM presentations on the road. The ThinkPad 560 is an ultraslim notebook with an external floppy drive (no CD-ROM drive) and a bright 12.1-inch screen. You can tuck it under your arm and take it anywhere.

THE BEST 3-D to date comes from the Matrox Mystique, our new number one graphics board.

DEALS ON PERSONAL PRINTERS

AGGRESSIVE PRICE WARS and tempting seasonal rebates are making personal printers affordable for just about anyone. This month we tested eight new printers, plus three previously reviewed models with their latest drivers (see "Personal Printers: Great Values for Every Budget" for a complete review, and the Top 10 Printers chart).

Two new monochrome printers earn spots on the chart: the $350 Brother HL-720 and the $479 HP LaserJet 5L Xtra. The Brother printer is the faster model, and it has a straighter paper path to prevent jams. The LaserJet 5L Xtra produces terrific text and graphics.

Four of the five top color printers are brand-new, including our Best Buy, the $279 Epson Stylus Color 500. The Stylus Color 500 has the best total package—good speed, competitive price, and low cost per page. We also like two color printers from Canon, the $279 BJC-4200 and the $179 BJC-240. Each comes with a huge software bundle and can use an optional photo kit for creating great-looking photographs.

Three new boards that accelerate 3-D images land on the Top 10 Graphics Boards chart this month. The $179 Matrox Mystique is our new number one graphics board. It delivers very good 2-D performance, and the 3-D images it creates are superior to any that we've seen so far.

Brad Grimes is an associate editor for PC World. *Editorial Assistant Allyson Bates, Staff Editor John Goddard, Assistant Editor Eric Hellweg, Senior Associate Editor Harry McCracken, Associate Editor Melissa Riofrio, and freelance writer Chris Uiterwijk contributed to the Top 100. Testing for the Top 100 by Dave Casini, Ulrike Diehlmann, Jeffrey Kuta, Kevin Mitchell, Mike Salayko, and Susan Silvius.* *See page 14 for contact information.*

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (9/17/96)	CPU	Comments
1	Micron Millennia P200 800/223-6571 www.micron.com	–	new	$2649	Pentium-200	Updated P-200 now has 32MB of RAM and is $100 more; has 3-D graphics card.
2	Dell OptiPlex GXpro 200 800/613-3355 www.dell.com	3	Aug 96	$3702	Pentium Pro-200	$408 price drop, fast corporate PC, modular design, built-in networking.
3	Dell Dimension XPS P200s 800/613-3355 www.dell.com	1	Sept 96	$2999	Pentium-200	Hot graphics card is a plus; fast PC, but not faster than EDO DRAM systems.
4	Dell Dimension XPS Pro200n 800/613-3355 www.dell.com	5	Aug 96	$2999	Pentium Pro-200	Virtually same value as number three; get this one if you might move to NT.
5	Dell OptiPlex GXMT 5200 800/613-3355 www.dell.com	4	Sept 96	$3771	Pentium-200	$260 price drop keeps fast, network-ready PC in the Best Buy ranks.
6	Compaq Deskpro 2000 Model 5200/1080 800/345-1518 www.compaq.com	6	Nov 96	$3218	Pentium-200	No sound, but great performance, high reliability rating, and clean design.
7	Micron Millennia Pro200 Plus 800/223-6571 www.micron.com	–	new	$4707	Pentium Pro-200	Expensive, fast SCSI-based PC has Iomega Jaz drive; P-166 version also good.
8	Gateway 2000 G6-200 800/846-2000 www.gw2K.com	–	new	$3249	Pentium Pro-200	Very fast, SCSI storage, ample expandability; good as a workgroup server.
9	Cyrix 6x86 P200+ 800/340-7501 www.cyrix.com	10	Nov 96	$3839	Cx6x86-P200+	Cyrix clues in, cuts price over $1300 to compete with mostly slower P-200s.
10	Gateway 2000 P5-200 800/846-2000 www.gw2K.com	8	Nov 96	$2999	Pentium-200	Roomy tower PC is loaded with extras like a 28.8-kbps fax-modem.
11	HP Vectra VL4 5/200MT 800/752-0900 www.hp.com	9	Sept 96	$3192	Pentium-200	Well-built PC, HP's service rating is fair; P-166 version is also good.
12	HP Vectra 500 Model 515MCx 5/166 800/752-0900 www.hp.com	11	July 96	$2790	Pentium-166	$422 drop makes this small-business PC a good buy; has voice mail.
13	Quantex QP6/200 Pro 800/896-4898 www.quantex.com	14	Aug 96	$2749	Pentium Pro-200	Fast, feature-rich, and $450 cheaper; but beware the low reliability rating.
14	Quantex QP5/200 SM-2 800/896-4898 www.quantex.com	13	Sept 96	$2549	Pentium-200	$450 price drop, lots of features and software; reliability rating hurts.
15	IBM PC 350 P200 800/426-2968 www.pc.ibm.com	15	Sept 96	$3903	Pentium-200	Great network PC includes Universal Serial Bus ports; a bit expensive.
16	ZDS Z-Station GT 500 800/533-0331 www.zds.com	12	Sept 96	$3570	Pentium-200	Fast and well put-together, except the add-in cards—they're upside down.
17	Sys Technology Performance Pro 200 800/613-9963 www.systechnology.com	–	new	$3179	Pentium Pro-200	Fastest PC to date; good graphics card, but otherwise generic components.
18	Netis N6200 PCI 800/577-7526 www.netistech.com	–	new	$3143	Pentium Pro-200	Enormous tower PC can take two CPUs; it's fast and affordable.
19	Tangent TC6200 800/800-5550 www.tangent.com	–	new	$2995	Pentium Pro-200	Fast, inexpensive for a Pro-200; can be minitower or desktop PC.
20	Tangent MediaGem 800/800-5550 www.tangent.com	16	Sept 96	$2695	Pentium-200	Fastest P-200 we've tested; built-in speakers and video input.

Best Buy See features chart, page 214; performance chart, page 218. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available November 26).

THIS MONTH'S TOP 20 Power Desktops chart has been brought to you by the number 200—it's everywhere, from CPU speeds to PC WorldBench scores. Except for the Cyrix 6x86 P200+ (which actually runs at 150 MHz) and the HP Vectra 500 P-166, every system on the Power chart sports a 200-MHz CPU. Plus, 19 of the 20 systems have PC WorldBench scores above 200. Now that's fast. But speed alone doesn't put a PC on the chart. We liked the $2550 DTK Quin-55M/P200, but the company's support policies gave us pause. And the $3449 Xi MTower SP P200 is sluggish—with a PC WorldBench score of 190, it lags behind many P-166s. For details, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score/performance	Vendor's system reliability	Features and design	Price	Vendor's service and support	Fax reprint number	Reader service number
91	216/very good	best	outstanding	inexpensive	best	3456	601
91	232/outstanding	best	outstanding	average	best	3401	602
90	208/very good	best	outstanding	average	best	3415	603
89	211/very good	best	very good	average	best	3402	604
89	216/very good	best	outstanding	average	best	3417	605
87	218/very good	best	very good	average	good	3442	606
87	230/very good	best	very good	very expensive	best	3457	607
86	234/outstanding	fair	outstanding	average	good	3458	608
86	223/very good	[2]	outstanding	expensive	[2]	3444	609
85	218/very good	fair	outstanding	average	good	3443	610
84	201/good	best	very good	average	fair	3421	611
84	192/good	best	very good	inexpensive	fair	3383	612
83	224/very good	poor	outstanding	inexpensive	fair	3405	613
83	216/very good	poor	outstanding	inexpensive	fair	3445	614
82	215/very good	fair	outstanding	expensive	fair	3419	–
82	215/very good	good	outstanding	average	fair [3]	3420	616
81	236/outstanding	[2]	outstanding	average	[2]	3459	617
81	230/very good	[2]	outstanding	average	[2]	3460	618
81	230/very good	[2]	outstanding	average	[2]	3461	619
80	220/very good	[2]	outstanding	inexpensive	[2]	3423	620
Scorecard weightings	Performance 25 percent	Reliability 25 percent	Features 20 percent	Price 15 percent	Support 15 percent	All products:	901

[2] Insufficient data.
[3] Limited data; score is based on responses for this company and average of all companies.

This Month's Best Buys

1 MICRON MILLENNIA P200

PRO: Very affordable, fast, well built, high reliability and service ratings

CON: Upgrading RAM might be awkward

The latest version of Micron's Pentium-200 Millennia is slightly faster than the model we tested in September, and it comes with the same high-quality design. Sure, the extra RAM helps (it's got 32MB; we tested the previous version with just 16MB), but with the price at just $2649, there's no arguing that Micron has managed to deliver a huge bang for your buck.

This Millennia P200 uses the Diamond Stealth 3D 2400 graphics card, which combines exceptional performance in Windows applications with the ability to speed up basic 3-D games, Web sites, and presentations. This time, however, the card comes with fully 4MB of EDO DRAM, which lets you see 16.8 million colors at resolutions above 800 by 600. The extra RAM can also help with special functions like *z-buffering*, a process that gives depth to 3-D scenes. The card is matched with a bright, crisp Micron 17FGX monitor that's pleasing to look at. We liked this system all the way down to its sturdy, responsive keyboard.

Micron Millennia P200

This month we also tested the $3049 Micron Home MPC P200. It's much like the Millennia P200, right down to its PC WorldBench score—215—which surprised us, seeing as it comes with a smaller, 256K secondary cache and only 2MB of graphics memory. The Home MPC adds telephony features, a 3-D wavetable sound card, and a slew of extra software. A 28.8-kbps Supra internal modem can handle voice mail and act as a speakerphone. Among the mounds of software are Internet in a Box from Spry, CompuServe, Quicken Deluxe for doing your finances, Microsoft Publisher Deluxe, Encarta, Cinemania, and more. For home offices and family rooms, the Home MPC is one of the best systems out there.

2 DELL OPTIPLEX GXPRO 200

PRO: Fast, great design, integrated networking

CON: Expensive

The GXpro is a very fast, easily upgradable powerhouse designed to work well in a corporate environment. It comes with some multimedia components, including integrated sound and speakers, but don't count on the ultimate multimedia experience. Dell puts most of the muscle behind this $3702 Pentium Pro into a LAN connection and a terrific interior design that network administrators will love.

With a PC WorldBench score of 232, the GXpro is one of the fastest PCs we've tested. The graphics hardware is top-notch—a Number Nine Imagine 128 Series 2 ▶

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Micron Millennia P200*	Pentium-200	32	512	2.1	Diamond Stealth 3D 2400	4/EDO DRAM	17/16	.26	8X
2	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
3	Dell Dimension XPS P200s*	Pentium-200	16	512	2.6	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	8X
4	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.3	.28	8X
5	Dell OptiPlex GXMT 5200*	Pentium-200	32	512	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/15.6	.28	8X
6	Compaq Deskpro 2000 Model 5200	Pentium-200	32	256	1.1	integrated Cirrus Logic 5436	2/EDO DRAM	15/14	.28	8X
7	Micron Millennia Pro200 Plus	Pentium Pro-200	32	256	2.1	Number Nine Imagine 128 Series 2	4/VRAM	17/16	.26	8X
8	Gateway 2000 G6-200	Pentium Pro-200	32	256	2.1	Matrox Millennium	4/WRAM	17/15.9	.25	8X
9	Cyrix 6x86 P200+	Cx6x86-P200+	32	256	4.1	Matrox Millennium	2/WRAM	15/14	.28	8X
10	Gateway 2000 P5-200	Pentium-200	32	512	3.2	Matrox Millennium	2/WRAM	17/16	.25	8X
11	HP Vectra VL4 5/200MT	Pentium-200	16	256	2.5	Matrox Millennium	2/WRAM	15/13.5	.28	8X
12	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	1.6	integrated Trio64	1/DRAM	15/13.7	.28	4X
13	Quantex QP6/200 Pro	Pentium Pro-200	32	256	2.5	STB Lightspeed 128	2/MDRAM	17/16	.26	6X
14	Quantex QP5/200 SM-2	Pentium-200	32	512	2.5	STB Lightspeed 128	2/MDRAM	17/16	.26	8X
15	IBM PC 350 P200	Pentium-200	32	512	1.6	integrated Trio64V+	2/EDO DRAM	17/15.5	.28	6X
16	ZDS Z-Station GT 500	Pentium-200	32	256	2.6	integrated ATI-264VT	2/SGRAM	17/15.5	.26	8X
17	Sys Performance Pro 200	Pentium Pro-200	32	256	2.5	Matrox Millennium	2/WRAM	17/15	.28	8X
18	Netis N6200 PCI	Pentium Pro-200	32	256	2.1	Matrox Millennium	2/WRAM	17/15.1	.28	6X
19	Tangent TC6200	Pentium Pro-200	32	256	2.1	STB Lightspeed 128	2/MDRAM	17/15.7	.27	8X
20	Tangent MediaGem	Pentium-200	32	512	2.1	STB Lightspeed 128	2/MDRAM	17/15.6	.28	6X

*Best Buy

graphics card with 4MB of VRAM, and a bright, crisp 17-inch Dell D1728D monitor—but most of the configuration is geared toward business. The PC comes ready to plug into your network with an integrated 3Com ethernet adapter. The integrated Vibra 16 sound chip and Altec Lansing ACS 31 speakers are fairly plain, but the 8X CD-ROM drive is fast.

Dell OptiPlex GXpro

The OptiPlex GXpro's desktop design is a vast improvement over previous systems. It's one of the easiest-to-upgrade PCs we've seen. The case is simple to remove, and the internal construction is modular. Cards are housed on a vertical riser plane that slides out at the touch of a lever. Even the power supply swings aside for effortless access to the motherboard and drive bays. An easy-to-upgrade tower version is also available. Like the number three Dimension XPS P200s, the GXpro uses DIMM memory modules rather than SIMMs. People who service computers love these newer modules because they make it easier to add memory and don't require you to remove lower-capacity modules to make room for the new ones. Unlike other systems with DIMM sockets, the OptiPlex GXpro has four sockets instead of two. This leaves three sockets open, so graphics professionals and other people who crave lots and lots of RAM can fill 'er up.

3 DELL DIMENSION XPS P200S

PRO: Big hard drive, 8X CD-ROM drive, fast graphics card, 28.8-kbps fax-modem

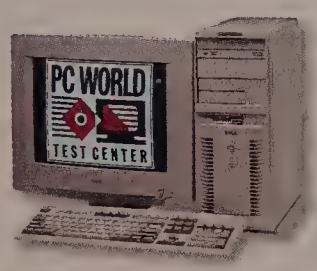
CON: A bit slower than we expected considering use of fast SDRAM; no speakers

Dell's $2999 Dimension XPS P200s stays in the Best Buy ranks despite a $50 price adjustment upward. The XPS P200s is the top-end PC in Dell's "s" series, the follow-on to the well-regarded "c" line of Dells that topped our charts for months.

The updated Intel chip set in Dell's "s" series supports SDRAM, a type of main memory that's faster than today's popular EDO DRAM. It's difficult to draw hard conclusions, considering the different configurations of the Pentium-200s we've tested, but SDRAM doesn't seem to have

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
–	Vibra 16 with wavetable	minitower	128	512	2	3/1	5	3/1	24	Sat., Sun.	CIS, WWW
–	integrated Vibra 16	desktop	512	256	3	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	integrated Vibra 16	minitower	64	512	1	3/1	4	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	minitower	128	512	2	3/1	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	integrated Vibra 16	minitower	128	512	2	3/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	compact	128	256	2	2/0	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster AWE32	minitower	128	256	2	2/1	4	3/1	24	Sat., Sun.	CIS, WWW
–	Sound Blaster 16 PnP	tower	256	256	2	3/6	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster AWE32	minitower	256	512	0	1/3	4	3/3	24	Sat., Sun.	BBS, WWW
28.8	Ensoniq Soundscape Vivo	tower	256	512	0	2/6	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster 16	minitower	128	512	4	2/1	4	3/3	11	–	AOL, BBS, CIS, WWW
28.8	Sound Blaster 16	minitower	128	256	4	2/1	4	1/1	16	Sat.	AOL, BBS, CIS, WWW
33.6	Ensoniq Vivo-90	minitower	128	256	0	2/1	3	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
28.8	Ensoniq Soundscape Vivo	minitower	128	512	0	3/2	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
–	–	desktop	192	512	4	1/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Creative Labs Vibra 16	minitower	192	512	4	4/1	5	3/3	24	–	BBS, CIS, MSN, WWW
28.8	Sound Blaster 32 PnP	minitower	128	512	2	3/1	4	1/1	24	Sat., Sun.	–
33.6	Sound Blaster 16 PnP	tower	256	512	6	3/0	5	1/3	10	Sat.	BBS, WWW
28.8	Sound Blaster 32 PnP	desktop	1024	512	6	2/2	4	3/3	11	Sat.	BBS, WWW
–	Sound Blaster 32 PnP	desktop	512	512	6	1/1	6	3/3	11	Sat.	BBS, WWW

done the P200s much good. Its PC WorldBench score of 208 lags behind those Pentium-200 desktops that use EDO DRAM. Part of the problem simply may be that Dell hasn't finished fine-tuning the P200s. We'll retest soon to find out if its speed has improved. In the meantime, though, the P200s is still among the fastest Dell Dimension systems we've ever tested.



Dell XPS P200s

One thing Dell doesn't have to tweak is the graphics card. Our test system featured the Number Nine Imagine 128 Series 2 with 4MB of VRAM. While this card adds more than $300 to the price, it can handle all your graphics chores, even high-end image editing and desktop publishing. It even has 3-D hardware and support for CAD acceleration. Other peripherals are also tops: the 8X CD-ROM drive, a 512K pipeline-burst secondary cache, a crisp Dell 17-inch monitor, and a U.S. Robotics 28.8-kbps fax-modem.

The on/off button is circular, slightly recessed, and smack in the middle of the front panel. There's a wide foot at the minitower's base to help prevent tipping. Inside the P200s you'll find several other nice design touches: An extremely quiet fan augments the power supply fan, memory is supplied on high-capacity DIMMs, and a vertically mounted hard drive is placed just behind the internal speaker to save space.

Dell bundles Microsoft Office Professional with this system, but doesn't include speakers to go with the integrated sound chip. A pair of basic speakers will cost another $36. Printed and on-screen documentation is clear and complete. Dell's reliability and service are highly rated by our readers, and the three-year parts warranty, year of free on-site service, and 30-day money-back guarantee are all fine offerings.

If you don't want to spend quite as much and don't need Pentium-200 speed, we recommend the $2649 Dimension XPS P166s, which we tested with 16MB of RAM, a 17-inch monitor, and a 28.8-kbps fax-modem. Like the P200s, it's not the fastest in its processor class, but it's still a good performer. ▶

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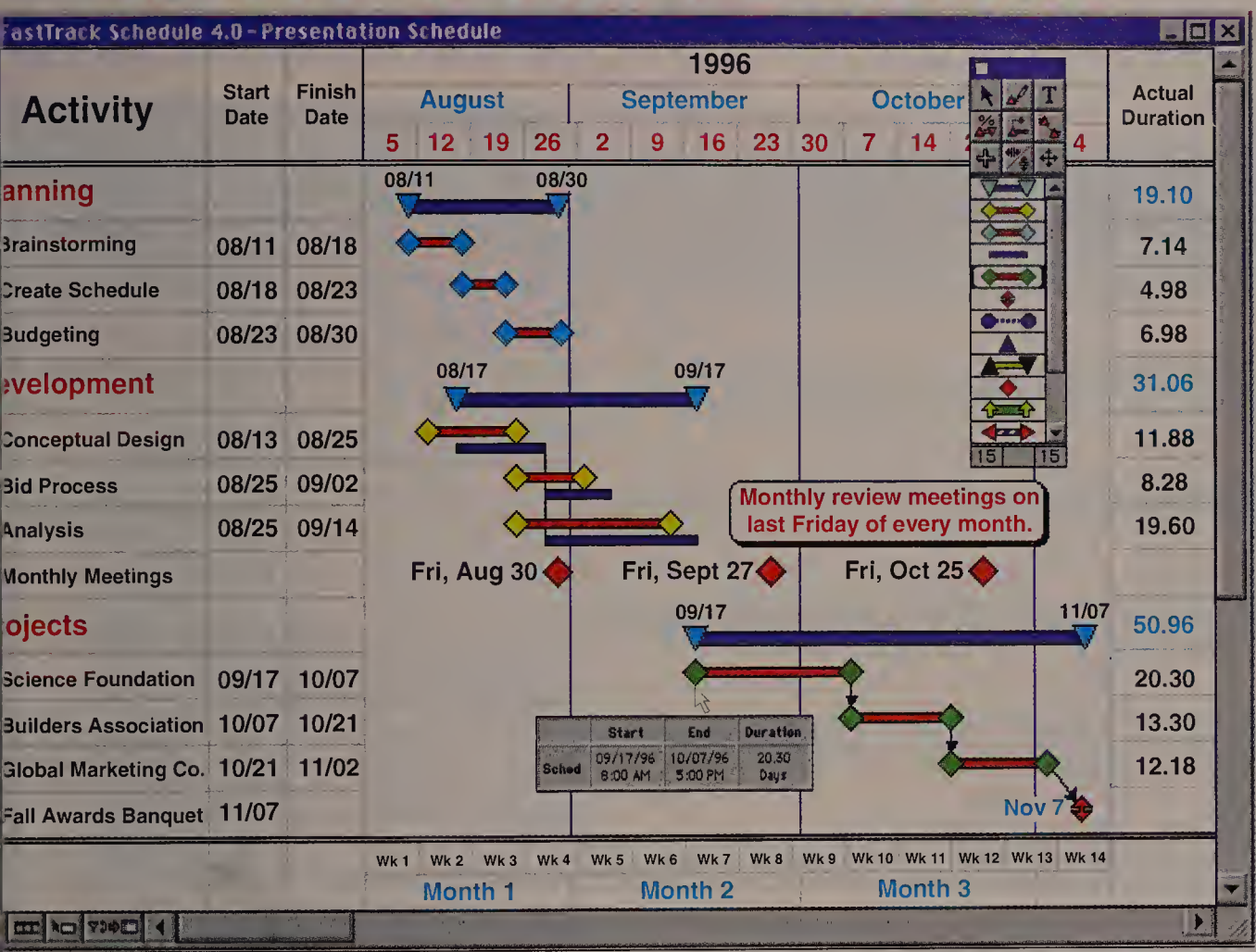

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Windows Magazine

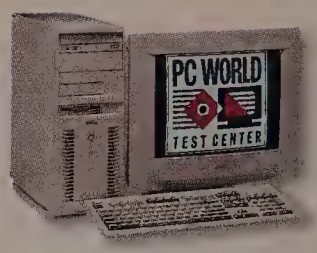
4 DELL DIMENSION XPS PRO200N

PRO: Well designed, powerful graphics card

CON: Sluggish for a Pentium Pro-200

For a loaded Pentium Pro-200 that's as well built as this one, $2999 is a good deal. The Dimension XPS Pro200n has a roomy hard disk, an 8X CD-ROM drive, and a feature-rich Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM and support for 3-D acceleration. Dell also bundles Microsoft Office Professional software, so you can start working immediately.

The minitower setup—the same as that of the Dimension XPS P200s—is a big improvement over previous Dimension designs. The system's tidy new interior makes it easy to install upgrades.



Dell XPS Pro200n

The speed of this Pentium Pro-200 is a little disappointing. The system's PC WorldBench score of 211 is the lowest of all the Pentium Pro-200s we've tested—just 3 points higher than that of the number three Dimension XPS P200s, which uses a Pentium-200 processor. Still, the XPS Pro200n is a fast, loaded PC that carries a three-year warranty. ▶

TOP 20 POWER DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Micron Millennia P200*	Pentium-200	32	512	216
2	Dell OptiPlex GXpro 200*	Pentium Pro-200	32	256	232
3	Dell Dimension XPS P200s*	Pentium-200	16	512	208
4	Dell Dimension XPS Pro200n*	Pentium Pro-200	32	256	211
5	Dell OptiPlex GXMT 5200*	Pentium-200	32	512	216
6	Compaq Deskpro 2000 Model 5200/1080	Pentium-200	32	256	218
7	Micron Millennia Pro200 Plus	Pentium Pro-200	32	256	230
8	Gateway 2000 G6-200	Pentium Pro-200	32	256	234
9	Cyrix 6x86 P200+	Cx6x86-P200+	32	256	223
10	Gateway 2000 P5-200	Pentium-200	32	512	218
11	HP Vectra VL4 5/200MT	Pentium-200	16	256	201
12	HP Vectra 500 Model 515MCx 5/166	Pentium-166	16	256	192
13	Quantex QP6/200 Pro	Pentium Pro-200	32	256	224
14	Quantex QP5/200 SM-2	Pentium-200	32	512	216
15	IBM PC 350 P200	Pentium-200	32	512	215
16	ZDS Z-Station GT 500	Pentium-200	32	256	215
17	Sys Technology Performance Pro 200	Pentium Pro-200	32	256	236
18	Netis N6200 PCI	Pentium Pro-200	32	256	230
19	Tangent TC6200	Pentium Pro-200	32	256	230
20	Tangent MediaGem	Pentium-200	32	512	220

*Best Buy

Word 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · WordPerfect 6.1 for Windows · Excel 7.0 for Windows 95 · Paradox 5.0 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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The Lexmark 2050 Color Jetprinter.

Step # 2

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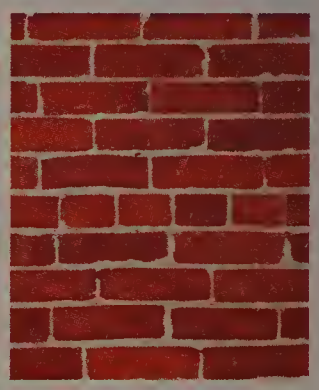
"The Canon® is pretty good."

"I'd go with HP.®"



"Lexmark? Never heard of it."

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The Unknown CFO of Lexmark International, Inc.
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Step 5 CLOSING THE SALE AND COLLECTING YOUR COMMISSION!

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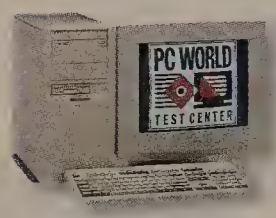
5 DELL OPTIPLEX GXMT 5200

PRO: Fast, built-in networking, hot graphics card

CON: Expensive for a P-200

The Pentium-200 version of Dell's network-ready OptiPlex GXMT line is a real greyhound. With a PC WorldBench score of 216, it's one of the fastest P-200 systems we've tested. While its less expensive sibling, the $3394 OptiPlex GXMT 5166, also is a good value, the $3771 OptiPlex GXMT 5200 races right past it to earn a Best Buy.



Dell GXMT 5200

The high performance of our test system was helped along by the unit's copious helping of RAM, big secondary cache, and Number Nine Imagine 128 Series 2 graphics board with 4MB of VRAM. The OptiPlex GXMT 5200 now has an 8X CD-ROM drive that replaces the slower quad-speed model it used to come with. The 16-bit integrated Vibra sound and Altec Lansing speakers are decent, if not exciting.

The minitower case is sturdy and easy to open, and the 3Com ethernet adapter is integrated, saving you an expansion slot. The expansion slots hover above the motherboard on a daughtercard, so you don't have to worry about system chips getting in the way of longer boards.

As with all its OptiPlexes, Dell backs the GXMT 5200 with a three-year warranty.

New This Month

The following PCs made our Power Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

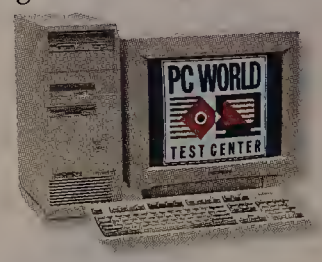
7 MICRON MILLENNIA PRO200 PLUS

PRO: Fast, Iomega Jaz drive, good graphics card and CD-ROM drive

CON: Very expensive, no modem

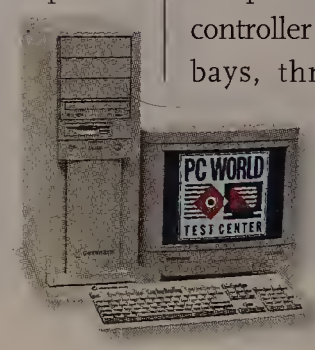
Micron's Millennia Pro200 Plus is a power user's dream and a bean counter's nightmare. Our test unit was decked out with the best components Micron offers, and it's got a whopping $4707 price tag to prove it. It's the kind of system we'd love to own if our ship ever came in.

Fear not, though. You *can* own the Millennia Pro200 Plus if you can live without all the frills. You can save $399 if you cut out the Iomega Jaz drive. You may also decide that you don't need the high-powered Number Nine Imagine 128 Series 2 graphics card with 4MB of VRAM (another $500 off). These cost-cutting measures won't hurt performance very much (the Millennia Pro200 Plus pulled down an impressive PC WorldBench score of 230) as long as you stick with common business applications such as the ones in our test suite. When testing graphics boards with our PC WorldBench suite, we've particularly noticed that the Imagine 128 Series 2 is no faster than a board like the Diamond Stealth 3D, which Micron also offers in its systems.



Micron Pro200 Plus

The Millennia Pro200 Plus is a SCSI system. Its wide array of storage options—the Jaz drive (which uses removable 1GB cartridges), a 2.1GB Seagate hard drive, and a speedy Plextor 8X CD-ROM drive—are all attached to a PCI-based BusLogic SCSI-2 controller. A Sound Blaster wavetable sound card drives a pair of Advent AV270 speakers that sound decent, while a Micron 17FGx monitor provides a bright, crisp display. Micron also throws in a copy of Microsoft Office 95 Professional.



Gateway 2000

With all this power, things get hot inside the Millennia Pro200 Plus. That's why Micron has smartly placed three fans inside this minitower to keep the components cool. Getting to the motherboard is a snap, thanks to the Micron's easy-open case. You can add up to four add-in cards (two of them PCI cards) and two externally accessible drives. Two open SIMM sockets are easy to access.

Micron covers the RAM and CPU with a five-year warranty. Other parts are covered for three years. Tech support lines are open around the clock, although lately we've been having trouble getting through in a timely fashion. Still, readers seem to have little trouble with Micron—the most recent results of our ongoing reliability and service survey show that the company has earned the highest marks for both.

8 GATEWAY 2000 G6-200

PRO: Superfast, roomy, SCSI controller

CON: Reliability score is fair, no modem

The $3249 Gateway 2000 G6-200 casts a shadow over much of the competition, and not just because its tower is several inches taller than the minitower PCs we usually see. It's also an extremely powerful Pentium Pro-200 system, capable of filling the role of workstation or server in a workgroup environment. The only thing that keeps this PC from vaulting to the top of our chart is Gateway 2000's rating for system reliability—Gateway customers responding to our survey give the company lower marks than do customers of Dell and Micron, for example.

The G6-200's PC WorldBench score of 234 is one of the highest we've seen. And some of its features, like the Matrox Millennium graphics card with 4MB of WRAM and the crisp 17-inch Trinitron-style monitor, are top-of-the-line. It has an Adaptec AHA-2940 Ultra Wide SCSI controller and (count 'em) nine open drive bays, three of which are accessible through the front panel. There are also four free add-in card slots, including three PCI slots. Like some current desktops, the G6-200's SIMM sockets can take up to 256MB of RAM. This is better than other hot new PCs that have two DIMM sockets for synchronous memory. Currently, SDRAM comes only in 32MB DIMMs; therefore, PCs with this configuration can hold only 64MB of RAM.

Navigating the G6-200's interior is as close to a pleasure as playing near a bunch of wires can get. The size of the sturdy tower case leaves all the bays, slots, and sockets at your fingertips. The drive bays have quick-release latches to make them easy to upgrade. There's also an extra fan to keep the Pentium Pro processor from overheating.

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TRAVELING SOFTWARE

Circle 239 on reader service card

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Professional and a pair of Altec Lansing ACS 40 speakers with the G6-200, but no modem. The company backs this system with a three-year parts and labor warranty and round-the-clock support.

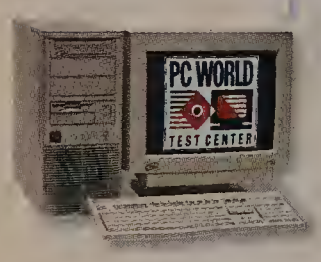
17 SYS TECHNOLOGY PERFORMANCE PRO 200

PRO: Blazing speed, good graphics board

CON: Flimsy keyboard and case, poor monitor

We have a new top performer. Sys Technology's $3179 Performance Pro 200 has earned the highest PC WorldBench score to date—a blazing 236. It's a fast, feature-laden PC, but it comes from a relatively unproven vendor.

The Performance Pro 200 includes a full-blown 2MB Matrox Millennium graphics card with a 220-MHz RAM digital-to-analog converter. The high-speed RAMDAC can support flicker-free refresh rates at high resolutions and color depths, making the system ideal for graphics professionals who use large monitors and photo-realistic images. Some PC vendors use a version of the Millennium with a slower RAMDAC. This won't slow Windows at resolutions up to 1024 by 768, but it can hurt performance at higher resolutions.



Sys Technology

Unfortunately, Sys paired a high-end graphics board with a low-end monitor. The 17-inch Sys model that came with our test PC flickered and displayed ugly colors. Sys does offer various other 17-inch units from reputable monitor manufacturers like Sony, Nokia, and ViewSonic for about $60 to $370 extra.

Overall, the minitower design is unremarkable. The plastic on the front cover bends easily. In addition, the keyboard, which looks like a cheap imitation of a Windows 95 keyboard, feels rickety. Inside, components are well organized, with room for four extra drives and four add-in cards. There's also an extra fan blowing on the CPU to keep it cool.

The Performance Pro 200 earns a spot on the chart because of its speed and features. It's hard to find a power system that offers this kind of bang for your buck. Some of the collateral features are less than spectacular. Sys offers a one-year warranty. There's no overall handbook, just a collection of manuals. Aside from some fax software and graphics programs that come with the modem and graphics card, there are no applications.

18 NETIS N6200 PCI

PRO: Fast, good price for a Pentium Pro-200

CON: Outta control huge, scant support policies

If you're looking for Pentium Pro power but don't want to spend a lot of money, the Netis N6200 PCI may be the ticket. Built more like a workstation than a mere personal computer, the N6200 PCI earned an impressive PC WorldBench score of 230. And at just $3143, it's a bargain compared to other Pentium Pro-200 systems in the Top 20.

Netis, which usually sends us unimpressive configurations, didn't skimp on quality components this time. There's a Toshiba 6X CD-ROM drive, a U.S. Robotics 33.6-kbps internal fax-modem, and a fast Matrox Millennium graphics card with 2MB of WRAM. Unfortunately, the 17-inch Sampo Alphascan 17MX KM-720 monitor produces a lackluster picture and slight flicker.

Netis N6200 PCI

The N6200 PCI is housed in a monster tower case that's too big for the average work space. However, it would look perfect in the server room of an office. Its internal design also lends it to a server environment: It has a second CPU socket for dual processing, and six open SIMM sockets for loading up on memory. Having five open add-in card slots is good, but three free drive bays is fairly ordinary.

Netis backs its systems with a one-year parts warranty. Tech support is available for only 10 hours on weekdays and 6 hours on Saturdays.

Server shoppers will be interested in the Netis N6200 PCI tower system, but the company can't deliver the intangibles, like quality round-the-clock support, that other Top 20 vendors can.

19 TANGENT TC6200

PRO: Fast, affordable, 28.8-kbps fax-modem

CON: Insufficient data to rate reliability and service

The TC6200 is a fast, inexpensive Pentium Pro-200 system. It grabbed an impressive PC WorldBench score of 230, making it one of the fastest PCs we've tested, and at just $2995, it's a bargain.

Its lineup of features includes a fast STB Lightspeed 128 video card, a SupraExpress 28.8-kbps fax-modem, a Sound Blaster 32 PnP sound card, and Labtech CS 600 speakers. The 17-inch CTX monitor is adequate, with nice buttons that melt away against the control panel.

This musty-gray desktop system is a Transformer toy for adults. If you'd prefer to save desktop space, the TC6200 converts into a minitower. Tangent provides extra screws, case panels, and full instructions to guide you through the procedure. If you don't want to alter the appearance of your PC, Tangent says you can take $20 off the price of the system by forgoing the extra panels.

Tangent TC6200

The system's interior design is not as versatile, but it is easy to upgrade. There are two free externally accessible bays, three open PCI slots, one shared PCI/ISA slot, and six free SIMM sockets. If you're considering adding a second processor, the Tangent PC is one of the few we've tested to have a second CPU socket.

All in all, the TC6200 is a rugged Pentium Pro-200. Tangent offers a limited three-year warranty, and toll-free tech support is available 11 hours on weekdays and 6 hours on Saturdays. Manuals for the major components are included, as well as a "Getting Started" guide, a glossary, and an index. ▶

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **DTK Quin-55M/P200**
- **Xi MTower SP P200**

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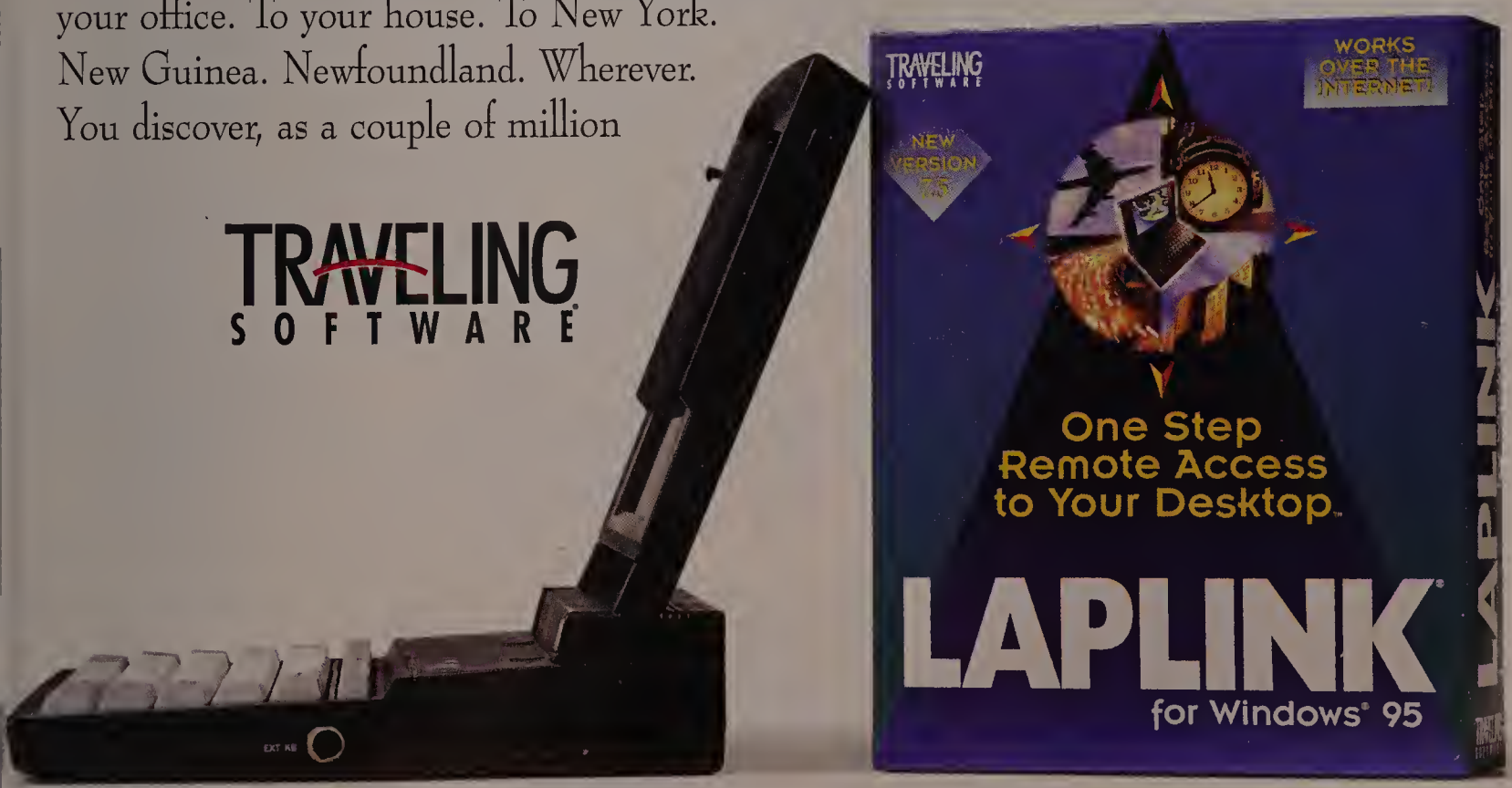

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Circle 243 on reader service card

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (9/17/96)	CPU	Comments
1	Dell Dimension P133v 800/613-3355 www.dell.com	–	new	$1799	Pentium-133	Fast, affordable; sound and modem are nice perks; good first PC.
2	Micron Millennia P133 800/223-6571 www.micron.com	1	Mar 96	$1899	Pentium-133	Similar to number one Dell but no modem; P-150 and -166 also good values.
3	Quantex QP5/120 M-4 800/896-4898 www.quantex.com	4	Nov 96	$2149	Pentium-120	$100 off; good hardware/software for the home; low reliability rating.
4	Dell OptiPlex GXMT 5133 800/613-3355 www.dell.com	–	Apr 96	$2477	Pentium-133	Quick corporate PC with built-in networking; we also like the P-166 version.
5	Gateway 2000 P5-133 800/846-2000 www.gw2K.com	5	Nov 96	$1779	Pentium-133	Slight price drop ($85), fast graphics card; sound costs extra.
6	HP Pavilion 7130P 800/724-6631 www.hp.com/info/pchome/	–	new	$2348	Pentium-133	Home PC with photo scanner is sluggish; look for new P-166 version.
7	HP Vectra VE 5/133 800/752-0900 www.hp.com	–	new	$2170	Pentium-133	Corporate PC with nice touches; Unified Memory Architecture slows it down.
8	Gateway 2000 G6-180 800/846-2000 www.gw2K.com	–	new	$2384	Pentium Pro-180	Faster than a typical P-200, good workgroup server.
9	Micro Express MicroFlex PCI/5133 800/989-9900 www.wpages.com/	–	Apr 96	$1599	Pentium-133	Fast system for under $1600; early returns indicate below-average reliability.
10	HP Vectra XM5/120 Series 4 800/752-0900 www.hp.com	20	Oct 96	$1960	Pentium-120	$324 price drop vaults this well-built corporate PC up the chart.
11	IBM PC 350 P166 800/426-2968 www.pc.ibm.com	–	new	$2493	Pentium-166	Superior design is worth the extra money; great networking features.
12	DirectWave Blue Thunder P133 MVP Pro 800/882-8108 www.directwave.com	–	Oct 96	$1699	Pentium-133	Huge $450 price drop, fast for a P-133; unknown system reliability and service.
13	ProGen Discover MPEG II P150 800/776-9595 www.progen.com	7	Nov 96	$1599	Pentium-150	An option for gamers on a budget; we don't have data on the vendor.
14	Xi P133MTower SP 800/432-0486 www.xicomputer.com	13	Mar 96	$1749	Pentium-133	Fast for a Pentium-133, lots of room for expansion.
15	Micro Express MicroFlex-686/P120+ 800/989-9900 www.wpages.com/	11	Aug 96	$1399	Cx6x86-P120+	Dirt-cheap PC with P-120-type power, but getting support can be difficult.
16	First Computer FCS P-120 800/900-1008 www.firstcomputer.com	–	Aug 96	$1399	Pentium-120	Nondescript but well-built PC makes the chart after a $400 price drop.
17	Acma zPower 166V 800/786-6888 www.acma.com	16	Sept 96	$1995	Pentium-166	$100 price drop; quick multimedia PC comes with PC Card slots.
18	Netis N5100 Media 800/577-7526 www.netistech.com	–	May 96	$1580	Pentium-100	Fast for a Pentium-100, but documentation is sparse.
19	Robotech Cobra XLT P-133 800/255-2215 www.robotechusa.com	14	July 96	$1799	Pentium-133	Fast, inexpensive home PC; spotty documentation and tech support.
20	National Microcomputers Expert 166 800/800-4662 www.sisna.com/natmicrosys/	–	July 96	$1945	Pentium-166	Generic PC is fast, but graphics and sound controllers are on the same card.

Best Buy See features chart, page 230; performance chart, page 234. Recommended as home system

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktops, Budget Desktops, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available November 26).

CHOOSE A BUDGET PC CAREFULLY. This month more sub-$2500 systems missed the Budget Desktops chart than made it. The best of the budget crop is Dell's Dimension P133v, our new leader. We like it for its low price and high speed. Plus, Dell has started throwing in a modem with this model. Among the also-rans are AST's $2499 Advantage 9308 and $1999 Advantage 9304. They're a couple of powerful home PCs, but some design quirks keep them off the chart. We also liked the $2442 Digital Venturis FX 5100, but it's pricey for a Pentium-100, and you can't add many components. For more details, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	Price	Vendor's system reliability	Features and design	PC WorldBench score/performance	Vendor's service and support	Fax reprint number[1]	Reader service number
92	average	best	very good	188/very good	best	3462	621
91	average	best	very good	182/very good	best	3268	622
85	average	poor	outstanding	187/very good	fair	3448	623
84	expensive	best	very good	184/very good	best	3463	624
83	average	fair	very good	192/very good	good	3449	625
83	expensive	best	outstanding	154/good	fair	3464	626
82	average	best	very good	166/good	fair	3465	627
81	expensive	fair	outstanding	218/outstanding	good	3466	628
81	inexpensive	[2]	very good	190/very good	[2]	3467	629
80	average	best	good	177/good	fair	3455	630
80	expensive	fair	outstanding	197/very good	fair	3468	–
80	inexpensive	[2]	outstanding	194/very good	[2]	3469	632
80	inexpensive	[2]	very good	183/very good	[2]	3451	633
80	inexpensive	[2]	very good	193/very good	[2]	3398	634
79	very inexpensive	[2]	good	175/good	[2]	3411	635
79	very inexpensive	[2]	very good	178/very good	[2]	3470	636
79	average	[2]	outstanding	199/very good	[2]	3429	637
79	inexpensive	[2]	very good	166/good	[2]	3471	638
78	average	[2]	outstanding	189/very good	[2]	3393	639
78	average	[2]	very good	197/very good	[2]	3472	640
Scorecard weightings	Price 25 percent	Reliability 25 percent	Features 20 percent	Performance 15 percent	Support 15 percent	All products:	902

[2] Insufficient data.

This Month's Best Buys

1 DELL DIMENSION P133V

PRO: Fast, well designed, top reliability score

CON: Limited RAM expandability, dark monitor

It's amazing what you can buy for under $2000 these days. Take, for instance, Dell's $1799 Dimension P133v, our new number one budget desktop. It's a powerful multimedia minitower from a company with a solid reputation for reliability and service.

Dell's value-line P-133 doesn't skimp much on performance or features. With its 16MB of SDRAM and a 256K pipeline-burst cache, it scored 188 in our PC WorldBench test suite—exceptional for its CPU class. Our test model even came with a 16-bit sound card, something you don't usually get with a bare-bones Dell PC. (Speakers cost extra.) As we went to press, Dell also had thrown in a 28.8-kbps fax-modem at no extra cost.

With its fine stripe pitch, the Dell Trinitron monitor displays crisp images and text; however, the unit that was included with our Dell P133v was a little dark, and we couldn't improve the brightness.

Dell Dimension P133v

For RAM expansion, the Dimension P133v uses not SIMMs but DIMMs, which hold more memory on a module. The system comes with two DIMM sockets that can hold a total of 64MB of synchronous RAM (two 32MB DIMMs). When 64MB DIMMs become available, the system will be able to hold 128MB.

If you want a little extra power, there's the Dimension P200v, which we reviewed in the November issue. It's nearly identical to the P133v, but it costs $200 more and is 9 percent faster.

2 MICRON MILLENNIA P133

PRO: Fast, loaded with useful features

CON: No modem

The $1899 Millennia P133, our former number one budget desktop, remains a Best Buy. It's a fairly good configuration for the money, especially the 2.1GB hard drive and the 8X CD-ROM drive. In addition, all Millennias now come standard with a Diamond Stealth 3D 2400 graphics card with 4MB of EDO DRAM (other cards are also available). The Stealth 3D is a fast card for running Windows business applications, plus it can speed up 3-D effects in games, presentations, and virtual worlds.

Micron P133

Price drops on other Micron Millennias we've tested keep them in contention. The P166 (reviewed in April) now goes for $2099, and the P150 (reviewed in May) sells for $1999. These inexpensive systems are priced with 15-inch monitors and Microsoft Works. ▶

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Screen pitch (mm)	CD-ROM drive speed
1	Dell Dimension P133v*	Pentium-133	16	256	1.6	integrated Trio64V+	2/EDO DRAM	15/14	.25	8X
2	Micron Millennia P133*	Pentium-133	16	512	2.1	Diamond Stealth 3D 2400	4/EDO DRAM	15/13.6	.28	8X
3	Quantex QP5/120 M-4*	Pentium-120	32	512	3.1	STB Lightspeed 128	2/MDRAM	17/16	.26	8X
4	Dell OptiPlex GXMT 5133*	Pentium-133	16	256	1.6	integrated Trio64	2/DRAM	17/15.6	.26	8X
5	Gateway 2000 P5-133*	Pentium-133	16	256	2	STB Lightspeed 128	2/MDRAM	15/13.9	.28	8X
6	HP Pavilion 7130P	Pentium-133	16	256	1.6	integrated Trio64V+	1/DRAM	15/13.7	.28	6X
7	HP Vectra VE 5/133	Pentium-133	16	256	1.1	integrated SiS 6205	2/EDO DRAM	15/14	.28	8X
8	Gateway 2000 G6-180	Pentium Pro-180	16	256	3.2	STB Lightspeed 128	2/MDRAM	15/13.9	.25	8X
9	Micro Express MicroFlex PCI/5133	Pentium-133	16	256	1.6	STB Velocity 64 Video	2/VRAM	17/13.9	.28	8X
10	HP Vectra XM5/120 Series 4	Pentium-120	16	512	1.3	integrated Trio64	2/DRAM	15/13.5	.28	–
11	IBM PC 350 P166	Pentium-166	16	256	1.3	integrated Trio64V+	2/EDO DRAM	15/13.7	.28	6X
12	DirectWave Blue Thunder P133 MVP	Pentium-133	16	512	1.3	Diamond Stealth 3D 2000	2/EDO DRAM	15/16.1	.26	8X
13	ProGen Discover MPEG II P150	Pentium-150	16	512	1.3	ProGen Gold 64V+ PCI	2/EDO DRAM	15/13.7	.28	8X
14	Xi P133MTower SP	Pentium-133	16	512	1.3	Diamond Stealth64 Video VRAM	2/VRAM	17/15.6	.26	6X
15	Micro Express MicroFlex-686/P120+	Cx6x86-P120+	16	256	1.3	STB Powergraph 64 Video	2/DRAM	15/14.1	.28	8X
16	First Computer FCS P-120	Pentium-120	16	512	1.2	Matrox Millennium	2/WRAM	15/13.8	.28	6X
17	Acma zPower 166V	Pentium-166	16	256	1.3	Diamond Stealth64 Video-2001	2/EDO DRAM	15/13.7	.28	8X
18	Netis N5100 Media	Pentium-100	16	256	1.6	Diamond Stealth64 Video VRAM	2/VRAM	15/13.9	.28	4X
19	Robotech Cobra XLT P-133	Pentium-133	16	256	1.3	Number Nine 9FX Motion 331	2/EDO DRAM	17/15.4	.28	6X
20	National Microcomputers Expert 166	Pentium-166	16	256	2.1	ASUS PCI-AV868	2/DRAM	17/16.1	.26	6X

*Best Buy

3 QUANTEX QP5/120 M-4

PRO: Good software, low price for the features

CON: Low reliability rating, poor interior design

The Quantex QP5/120 M-4 minitower gives you a lot for your dollar—provided you aren't too fussy about reliability and service. Priced at $2149, this Pentium-120 has much of what you find in an expensive PC: great performance, lots of memory, a big hard drive, and a large monitor. Quantex loaded this system up with 32MB of RAM, a 512K secondary cache, and a 3.1GB hard drive—huge for a budget system. While 17-inch monitors can add hundreds of dollars to the cost of a PC, Quantex managed to bundle a good-quality MAG DX1795 with a fast STB Lightspeed 128 video card.

Our Quantex also came with some nice perks, including a 33.6-kbps fax-modem, an 8X Toshiba CD-ROM drive, and an Ensoniq Vivo-90 wavetable sound card. You get a nice software bundle, including Novell PerfectHome, Quicken SE, and Compton's Interactive Encyclopedia.

The Quantex's overall design is lackluster. The inside of the case is somewhat cluttered. It's hard to add RAM without unhooking some cables, and you can't install full-length ISA cards because the CPU is in the way.

Quantex

Quantex provides a three-year parts warranty on its systems. Toll-free tech support is available for 15 hours a day, seven days a week.

4 DELL OPTIPLEX GXMT 5133

PRO: Network ready, good performance

CON: Pricey for a budget PC

This month Dell shaved about $100 off the price of its OptiPlex GXMT 5133, bringing the cost to less than $2500 and qualifying it for a spot on our Budget chart. The company also discontinued the OptiPlex GXM 5100, a Best Buy on last month's chart. The combination of events lands the GXMT 5133 a Best Buy.

Like all OptiPlexes, the GXMT 5133 is well designed and ready for networking. It has an ethernet adapter integrated on the motherboard, plus software that supports most network standards. It's very easy to upgrade this system, because the graphics and sound chips are also inte-

		EXPANDABILITY						CUSTOMER SUPPORT			
Modem speed (kbps)	Sound board	Case style	Max. RAM (MB)	Maximum secondary cache (K)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
28.8	Creative Labs Vibra 16	minitower	64	512	1	3/1	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Creative Labs Vibra 16	minitower	128	512	2	2/1	5	3/1	24	Sat., Sun.	CIS, WWW
33.6	Ensoniq Soundscape Vivo-90	minitower	128	512	2	2/1	4	3/1	15	Sat., Sun.	BBS, Prodigy, WWW
–	integrated Vibra 16S	minitower	128	256	2	2/1	8	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	minitower	128	256	1	2/2	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	integrated Crystal 4232	minitower	128	512	2	1/2	5	1/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	Sound Blaster 32 PnP	desktop	192	256	4	1/1	3	3/3	11	–	AOL, BBS, CIS, WWW
–	Ensoniq Soundscape Vivo PnP	tower	128	256	2	3/6	5	3/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	Sound Blaster AWE32	minitower	128	512	2	3/1	7	2/2	9.5	Sat., Sun.	WWW
–	–	desktop	128	512	4	2/0	4	3/3	11	–	AOL, BBS, CIS, WWW
–	–	desktop	192	512	4	1/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
28.8	Sound Blaster AWE 32	minitower	256	512	2	3/0	3	3/3	11	Sat.	BBS, WWW
33.6	AudioDrive 32 PnP	minitower	128	512	2	3/2	4	3/1	9	–	BBS
–	Creative Labs Vibra 16	tower	128	512	2	5/2	6	3/3	11.5	Sat.	WWW
–	ESS ES1688 Audio Drive	minitower	128	512	4	3/1	6	2/2	9.5	Sat., Sun.	WWW
–	AudioDrive AD16 PnP	tower	128	512	2	3/0	6	1/1	11	Sat.	–
28.8	Sound Blaster 16	minitower	128	512	2	2/1	3	3/1	9.5	–	BBS, WWW
–	Creative Labs Vibra 16	compact	128	512	2	2/1	6	1/3	10	Sat.	BBS, WWW
28.8	Sound Blaster 16	minitower	128	512	2	3/3	4	3/1	9	–	BBS, WWW
28.8	ASUS PCI-AVB6B	minitower	128	512	2	2/1	4	3/3	10	–	BBS, WWW

grated on the motherboard, leaving a wealth of open add-in card slots.

Dell's OptiPlex systems now come with 8X CD-ROM drives. This is a nice touch for a PC that's not necessarily designed to be a multimedia system. We also like Dell's 17-inch monitor, with its sharp .26mm dot pitch.

Dell OptiPlex

While the OptiPlex GXMT 5133 isn't the fastest P-133 we've tested, its PC WorldBench score of 184 is solid. And although it's one of the most expensive PCs on the Budget chart, Dell has a design that's worth the money. If you're looking for a networkable PC that's under $2500, the GXMT 5133 is a good choice.

5 GATEWAY 2000 P5-133

PRO: Fast, great documentation, good design

CON: No modem or sound card at this price, reliability could be better

Gateway 2000's P5-133 features a nice design and an affordable price—just $1779. The angular case style has a more up-to-date feel than the curvy Gateways of the past; we found it very attractive. This PC is also one of the fastest P-133s we've ever tested, turning in an amazing PC WorldBench score of 192. All of which makes it a shoo-in for a Best Buy. It's a great business system, but not one that we'd recommend for home use unless you add a sound card and speakers.

The P5-133 we tested has a 2GB hard drive and an 8X Toshiba CD-ROM drive. The 15-inch CrystalScan monitor is a good basic display, but it's not Gateway's top of the line (the more expensive Vivitron). We can't find fault with the 2MB STB Lightspeed 128 graphics adapter, which has ranked near the top of our Top 10 Graphics Boards chart. The P5-133's low price also includes Microsoft Office Professional.

Gateway 2000

Gateway earns a good service and support score because of its fine support policies, but our readers still rate system reliability only as fair.

Gateway's $1729 P5-120 is also a good budget PC. A near peer of the P5-133, it has a P-120 CPU and a lower PC WorldBench score of 182. ▶

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76i/76m†	17" FST (15.7" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56i	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI
56m†	15" FST (13.6" VIS)	.28mm dot	1024x768 @ 80 Hz NI

† Built-in stereo amplifier and speakers. * Requires DDC compatible video card.
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New This Month

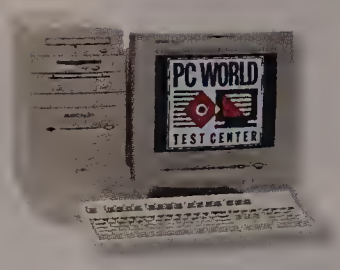
The following PCs made our Budget Desktops chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

6 HP PAVILION 7130P

PRO: Nice design, built-in photo scanner, 28.8-kbps fax-modem with telephony features

CON: Poor P-133 performance, 1MB of video RAM

The $2348 Hewlett-Packard Pavilion 7130P is a stylish P-133 minitower—too bad it's so slow. If you're looking for a home system, you'll love its cool design and neat features, but its performance falls short. With a PC WorldBench score of 154, it runs more like a slow P-100.



HP Pavilion

The Pavilion 7130P's most notable feature is its PhotoDrive scanner, which is built into the front of the minitower and accepts photos up to 4 by 6 inches. Just start up the EasyPhoto software, slide in a picture, and the image appears on the screen as it's scanned. The process takes about 30 seconds.

The case looks like that of any modern home electronics device, with rounded edges and art deco buttons. The 15- ▶

TOP 20 BUDGET DESKTOPS

	SYSTEMS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Dimension P133v*	Pentium-133	16	256	188
2	Micron Millennia P133*	Pentium-133	16	512	182
3	Quantex QP5/120 M-4*	Pentium-120	32	512	187
4	Dell OptiPlex GXMT 5133*	Pentium-133	16	256	184
5	Gateway 2000 P5-133*	Pentium-133	16	256	192
6	HP Pavilion 7130P	Pentium-133	16	256	154
7	HP Vectra VE 5/133	Pentium-133	16	256	166
8	Gateway 2000 G6-180	Pentium Pro-180	16	256	218
9	Micro Express MicroFlex PCI/5133	Pentium-133	16	256	190
10	HP Vectra XM5/120 Series 4	Pentium-120	16	512	177
11	IBM PC 350 P166	Pentium-166	16	256	197
12	DirectWave Blue Thunder P133 MVP Pro	Pentium-133	16	512	194
13	ProGen Discover MPEG II P150	Pentium-150	16	512	183
14	Xi P133MTower SP	Pentium-133	16	512	193
15	Micro Express MicroFlex-686/P120+	Cx6x86-P120+	16	256	175
16	First Computer FCS P-120	Pentium-120	16	512	178
17	Acma zPower 166V	Pentium-166	16	256	199
18	Netis N5100 Media	Pentium-100	16	256	166
19	Robotech Cobra XLT P-133	Pentium-133	16	256	189
20	National Microcomputers Expert 166	Pentium-166	16	256	197

*Best Buy

PERFORMANCE

Word 7.0 for Windows 95
Excel 7.0 for Windows 95
Picture Publisher 6.0 for Windows 95
Paradox 5.0 for Windows
WordPerfect 6.1 for Windows
1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC World8ench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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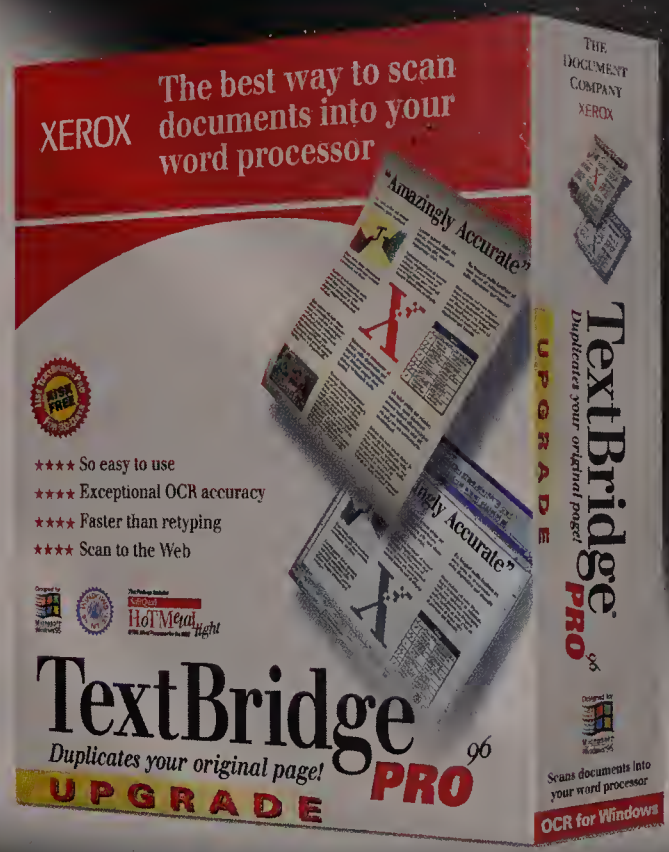

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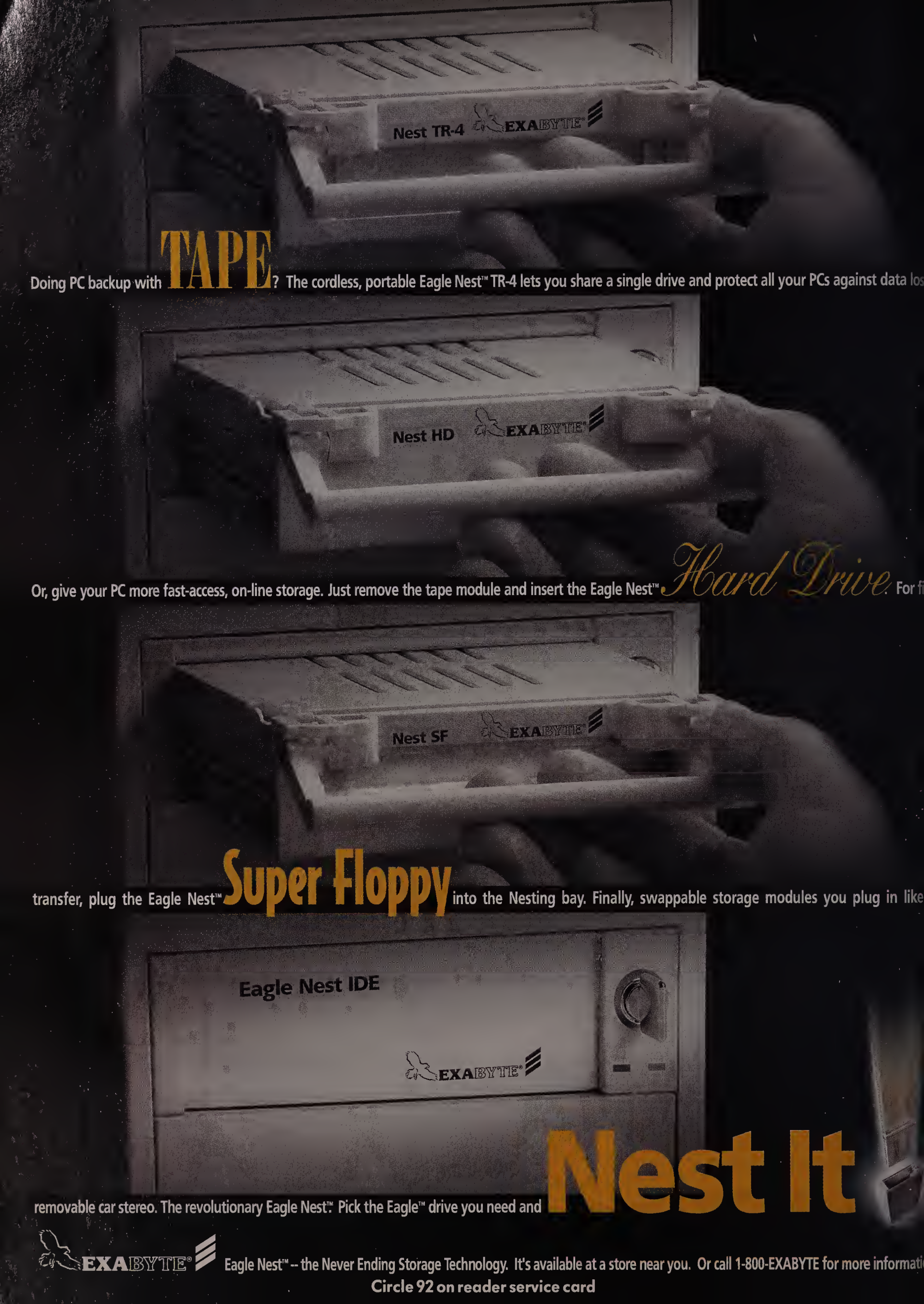

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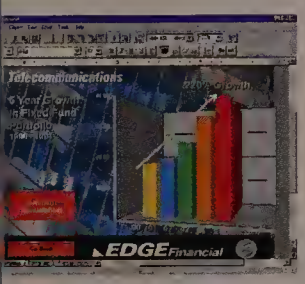

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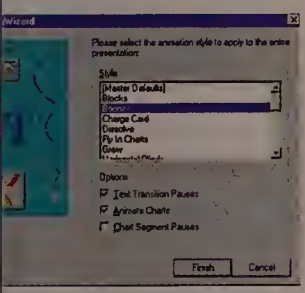

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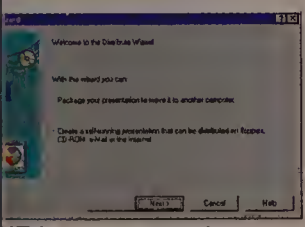

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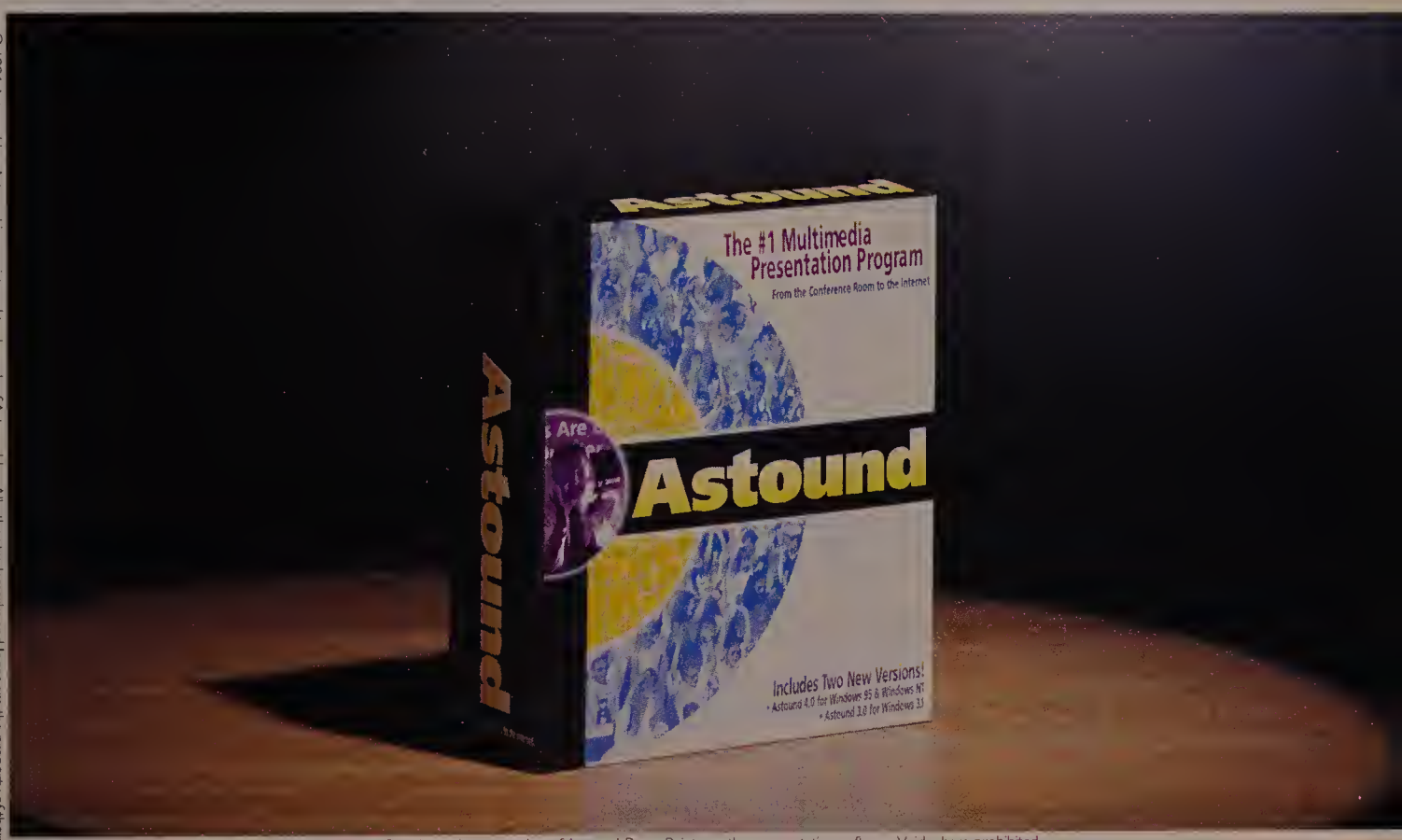

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inch monitor has speakers attached, which saves desk space.

Consider getting an extra megabyte of video RAM. The Pavilion comes with just 1MB, which isn't enough to see your freshly scanned photos in 16.8 million colors if you work at 800 by 600 resolution. It also slows the graphics system.

Overall, the Pavilion 7130P is a great home system for under $2500. It comes with tons of software, including a variety of entertainment titles.

As we went to press, HP released a P-166–based Pavilion with a photo scanner. The $2399 Pavilion 7280P will eventually replace the 7130P. It comes with 16MB of EDO RAM, a 2.5GB hard drive, an 8X CD-ROM drive, a 3-D graphics card, and a 33.6-kbps telephony modem. We will review it soon.

7 HP VECTRA VE 5/133

PRO: Excellent design, high reliability score

CON: Slow for a P-133, limited expandability

The $2170 HP Vectra VE 5/133 is a well-built corporate desktop. It comes with a slim design and a few nice ease-of-use touches. But it's not meant to be a stand-alone PC—the kind that you'd take home or get for your small business. If you're looking for a system that's fast and can handle a lot of cool new components, you should look elsewhere.

HP Vectra

The Vectra VE is HP's first corporate system to use Unified Memory Architecture, which takes some of the PC's main RAM and uses it for graphics memory, thereby eliminating the cost of a separate frame buffer. UMA keeps the price of the system down slightly—$2170 for a P-133 from Hewlett-Packard is a good price—but it also seems to slow performance. The Vectra VE's PC WorldBench score of 166 is lower than we'd expect from an HP Vectra, and it's well below average for a P-133 desktop. In the end, though, network administrators might overlook the speed hit in favor of the Vectra VE's quality and competitive price.

The system has a couple of thoughtful design elements. First, you can configure the Vectra VE to power up with a tap of the spacebar. Second, it makes sure all your work is saved if you happen to press the on/off button without using Windows' Shut Down feature.

Our unit had a $263 multimedia kit that includes an 8X CD-ROM drive, a 16-bit sound card, and headphones. Because the Vectra VE is marketed as a network client, the kit does not come standard. It must be installed by an HP dealer.

8 GATEWAY 2000 G6-180

PRO: Fastest budget PC, fast graphics card

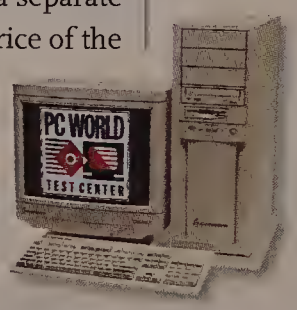
CON: Unimpressive monitor, low reliability score

Gateway's $2384 G6-180 tower PC is huge. It's not the type of PC you tuck out of the way at home or in your office. It's powerful, with a PC WorldBench score of 218, plus it's spacious, with room for nine extra drives and five extra add-in cards.

The G6-180 is the first system we've tested based on Intel's 180-MHz Pentium Pro. It's slightly faster than the average Pentium-200 and slightly slower than a Pentium Pro-200. But it costs the same as a similarly configured P-200, so it's a good value, especially if you might upgrade to Windows NT in the future.

Inside the cavernous tower case is a roomy 3.2GB hard drive and a quick STB Lightspeed 128 graphics card. All the drive bays and add-in cards are easily accessible, and a large fan blows across the motherboard to keep all the components cool.

About the only thing we didn't like about our G6-180 was the Gateway Vivitron15 monitor. The picture was slightly dull, and not as crisp as other flat-screen, Trinitron-style displays we've seen. We also had trouble getting rid of a horizontal line that kept moving up the screen.



Gateway 2000

The system comes with a glossy, magazine-like InfoBook that has color pictures and screen shots to help you set up and configure your PC. Gateway also throws in Microsoft Office 95 Professional.

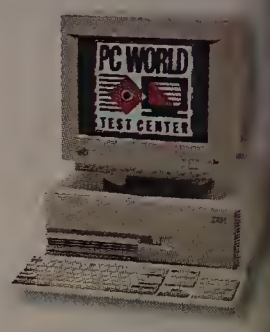
11 IBM PC 350 P166

PRO: Networking tools, USB ports, infrared kit

CON: Pricey for a budget PC, subpar monitor

If you're looking for an inexpensive computer, you may pass on IBM's cutting-edge features; but if you're looking for a networkable system that includes a few perks, you'll be pleased with the $2493 IBM PC 350 P166.

The system comes with special tools that allow a network administrator to monitor and work on the system from a central location. NetFinity can update software and track PC configurations across a network, while Wake-on-LAN lets administrators perform upgrades and take inventory when no one is in the office. Wake-on-LAN–enabled network cards do not come with the base system. Token ring and ethernet versions cost $120 extra.



IBM PC 350

The IBM PC 350 P166 comes with two Universal Serial Bus ports. USB allows you to daisy-chain several peripherals—from keyboards to printers—to a single high-speed port. The PC 350 P166 also has built-in infrared support, with a special port in back for connecting a receiver/transmitter. The optional infrared kit goes for $79.

With a PC WorldBench score of 197, the PC 350 is an average Pentium-166 performer. Its 15-inch IBM G50 monitor is crisp and comes with great controls, but its colors seem a bit dark. ▶

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- Acer 9346
- AST Advantage 9304
- AST Advantage 9308
- Digital Venturis FX 5100
- DTK Quin-55M/P133
- Everex Step Select P-133
- MIS M55Hi+ 166
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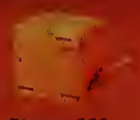
Phaser 550

Phaser 480X

Phaser 300X

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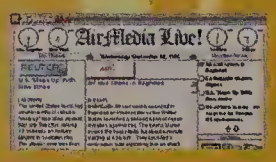

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PC WORLD

TOP 20 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (9/17/96)	CPU	Comments
1	Dell Latitude LM P133ST 800/613-3355 www.dell.com	1	Oct 96	$3199	Pentium-133	$650 price cut to make way for newer Dell notebooks; this one's still the best.
2	Dell Latitude XPi P133ST 800/613-3355 www.dell.com	3	Aug 96	$4399	Pentium-133	$200 off; priced with 24MB of RAM, which makes it fast; no CD-ROM drive.
3	Compaq LTE 5250 800/345-1518 www.compaq.com	–	new	$4198	Pentium-120	Exceptionally well built and fast; note small screen size on this model.
4	Dell Latitude XPi CD P150ST 800/613-3355 www.dell.com	–	new	$4599	Pentium-150	Nice touches, but high-end multimedia notebook can't beat number one Dell.
5	WinBook XP5 P120 800/468-1242 www.winbookcorp.com/	4	Apr 96	$2779	Pentium-120	Editor's note: At press time WinBook planned to discontinue this model.
6	IBM ThinkPad 560 P133 800/772-2227 www.pc.ibm.com	–	new	$4448	Pentium-133	Ultraslim notebook doesn't compromise screen or keyboard size.
7	IBM ThinkPad 760E 800/772-2227 www.pc.ibm.com	5	Sept 96	$6248	Pentium-133	The Rolls-Royce of notebooks—great features, but expensive.
8	NEC Versa 6030H 800/632-4636 www.nec.com	7	Nov 96	$4999	Pentium-133	$800 price drop, fast for a P-133, fine screen, built-in fax-modem.
9	Compaq Armada 4120T 800/345-1518 www.compaq.com	8	Nov 96	$4298	Pentium-120	Fairly fast, modular multimedia notebook uses up to three batteries at once.
10	Toshiba Tecra 720CDT 800/457-7777 www.toshiba.com	10	Sept 96	$5399	Pentium-133	$900 price drop keeps powerful notebook on chart; still costly.
	BUDGET NOTEBOOKS					
1	Toshiba Satellite 100CS 800/457-7777 www.toshiba.com	1	June 96	$1599	Pentium-75	On its way out, but some retailers still have this terrific entry-level notebook.
2	WinBook XP5 P100 800/468-1242 www.winbookcorp.com/	7	Nov 96	$1999	Pentium-100	Editor's note: At press time WinBook planned to discontinue this model.
3	IBM ThinkPad 560 P100 800/772-2227 www.pc.ibm.com	3	Nov 96	$2699	Pentium-100	Slim, lightweight notebook has comfortable keyboard.
4	Toshiba Satellite Pro 420CDS 800/457-7777 www.toshiba.com	6	Sept 96	$2698	Pentium-100	Best multimedia notebook under $2700; fastest budget portable.
5	AcerNote Light 356 800/733-2237 www.acer.com	5	Sept 96	$1999	Pentium-100	Fair price for a slim notebook; comfortable despite below-average screen.
6	Digital HiNote VP 800/642-4532 www.digital.com	10	Sept 96	$2399	Pentium-100	Light and well designed; great speed and a bright screen; $100 off.
7	Toshiba Satellite 110CT 800/457-7777 www.toshiba.com	9	Nov 96	$2499	Pentium-100	Great low-end notebook with active-matrix screen; needs more RAM.
8	Austin Edge XP P100 800/952-9816 www.austindirect.com	–	Sept 96	$2447	Pentium-100	Lightweight, super screen; compact design means keyboard is cramped.
9	Broadax NP8662D 800/872-4547 www.bsicomputer.com	–	Aug 96	$2095	Pentium-120	$205 drop lifts speedy P-120 onto chart; undistinguished support policies.
10	Sharp PC-3030 800/237-4277 www.sharp-usa.com	–	new	$2299	Pentium-100	Lightweight notebook has long battery life, but it's slow for a P-100.

Best Buy See features chart, page 244; performance chart, page 248.

[1] To order fax copies of system reviews, call 800/434-4495 from a touch-tone phone and use your credit card. You can order next month's reviews in advance: Power Desktop, Budget Desktop, or Notebook PCs Top 20 charts and capsule reviews ($9.95, available November 26).

DELL COUPLED ITS NEW Latitude XPi CD notebook with Intel's new mobile Pentium-150 processor and came out with a pretty good product. But the faster, less expensive Latitude LM P133ST is our top power notebook. Some of the most interesting portables didn't make the chart. Panasonic's $5399 CF-62 has a terrific case and a rewritable optical storage drive, but it's very bulky. Meanwhile, Austin's $4050 Edge Duet P133 comes standard with its own docking station, but the construction is a little shaky. For more details, visit PC World Online (http://www.pcworld.com/t20pcsnaps).

SCORECARD

★ Overall rating	PC WorldBench score	Performance	Price	Vendor's system reliability	Features and design	Vendor's service and support	Battery life (hours:min)/ rating	Traveling weight	Fax reprint number[1]	Reader service number
87	180	outstanding	inexpensive	good	very good	good [2]	4:32/good	heavy	3779	641
86	166	very good	average	good	very good	good [2]	5:20/very good	average	3771	642
84	149	very good	average	good	good	good	5:42/very good	average	3793	643
83	166	very good	average	good	very good	good [2]	2:59/good	average	3794	644
83	145	very good	inexpensive	fair	good	poor	6:19/outstanding	average	3736	645
83	146	very good	average	good	good	good	2:06/satisfactory	very light	3798	–
82	177	outstanding	very expensive	good	very good	good	2:02/satisfactory	average	3773	–
82	174	outstanding	expensive	good	very good	poor [2]	3:04/good	heavy	3785	648
82	143	good	average	good	very good	good	4:27/good	heavy	3786	649
82	160	very good	expensive	good	outstanding	fair	4:23/good	very heavy	3772	650
Scorecard weightings		Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent		
81	86	good	very inexpensive	good	satisfactory	fair	3:35/good	average	3754	651
80	132	very good	average	fair	good	poor	5:02/very good	average	3790	652
79	135	very good	expensive	good	good	good	3:35/good	very light	3789	–
78	142	outstanding	expensive	good	good	fair	4:02/good	heavy	3771	654
77	118	good	average	[3]	good	[3]	2:57/good	light	3777	655
76	139	very good	average	[3]	good	[3]	3:36/good	light	3776	656
76	98	good	expensive	good	good	fair	3:35/good	average	3792	657
73	132	very good	expensive	[3]	satisfactory	[3]	3:27/good	light	3795	658
73	141	outstanding	average	[3]	good	[3]	2:10/satisfactory	heavy	3796	659
73	89	good	average	[3]	satisfactory	[3]	4:56/very good	light	3797	660
Scorecard weightings		Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	All products:	903

[2] Limited data; score is based on responses for this company and average of all companies.
[3] Insufficient data.

POWER NOTEBOOKS

This Month's Best Buys

1 DELL LATITUDE LM P133ST

PRO: Large, crisp screen; terrifically fast

CON: None significant

The arrival of Dell's new Latitude XPi CD series of multimedia notebooks (see number four) means the top-ranked Latitude LM P133ST is more affordable than ever. Now just $3199, this Pentium-133 notebook scored an amazing 180 on our PC WorldBench test—smack-dab in the middle of performance results for P-133 *desktops*. The 12.1-inch active-matrix color screen is vivid and spacious, with a viewable area close to what you get with a standard 14-inch desktop monitor.

Dell Latitude LM

In our test, the Dell managed to wring 4.5 hours per charge out of its lithium ion battery. The traveling weight of 8.8 pounds, while heavy, isn't bad for a ▶

TOP 20 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (MB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Dell Latitude LM P133ST*	Pentium-133	8.8	16	810	active	12.1	800 x 600	256	lithium ion	touchpad
2	Dell Latitude XPi P133ST*	Pentium-133	7.2	24	1215	active	11.3	800 x 600	256	lithium ion	trackball
3	Compaq LTE 5250	Pentium-120	8.4	16	810	active	10.4	800 x 600	65,536	NiMH	eraserhead
4	Dell Latitude XPi CD P150ST	Pentium-150	8.4	16	1374	active	12.1	800 x 600	256	lithium ion	trackball
5	WinBook XP5 P120	Pentium-120	7.4	16	1295	active	10.3	640 x 480	65,536	lithium ion	eraserhead, touchpad
6	IBM ThinkPad 560 P133	Pentium-133	5	16	1080	active	12.1	800 x 600	65,536	lithium ion	eraserhead
7	IBM ThinkPad 760E	Pentium-133	7.8	24	1080	active	12.1	800 x 600	65,536	lithium ion	eraserhead
8	NEC Versa 6030H	Pentium-133	8.6	16	1358	active	12.1	800 x 600	65,536	lithium ion	touchpad
9	Compaq Armada 4120T	Pentium-120	10	16	1080	active	11.8	800 x 600	65,536	lithium ion	touchpad
10	Toshiba Tecra 720CDT	Pentium-133	10.6	16	1130	active	12.1	1024 x 768	16.8 million	lithium ion	eraserhead
	BUDGET NOTEBOOKS										
1	Toshiba Satellite 100CS*	Pentium-75	7.6	8	540	dual-scan	10.4	640 x 480	256	NiMH	eraserhead
2	WinBook XP5 P100*	Pentium-100	7.4	16	543	dual-scan	10.4	640 x 480	256	NiMH	eraserhead
3	IBM ThinkPad 560 P100	Pentium-100	5.8	16	810	dual-scan	11.3	800 x 600	256	lithium ion	eraserhead
4	Toshiba Satellite Pro 420CDS	Pentium-100	8.8	16	772	dual-scan	11.3	800 x 600	65,536	lithium ion	eraserhead
5	AcerNote Light 356	Pentium-100	6.8	16	810	dual-scan	10.4	640 x 480	65,536	NiMH	touchpad
6	Digital HiNote VP	Pentium-100	6.8	16	810	dual-scan	10.4	800 x 600	256	NiMH	touchpad
7	Toshiba Satellite 110CT	Pentium-100	7.4	8	814	active	11.3	800 x 600	65,536	NiMH	eraserhead
8	Austin Edge XP P100	Pentium-100	6.8	16	814	dual-scan	10.4	640 x 480	256	NiMH	eraserhead
9	Broadax NP8662D	Pentium-120	9.6	16	810	dual-scan	11.3	800 x 600	256	NiMH	touchpad
10	Sharp PC-3030	Pentium-100	6.8	8	543	dual-scan	11.3	800 x 600	65,536	lithium ion	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one. [2] Toll call.

multimedia notebook. As with most genuine power notes these days, the unit comes with both a floppy drive and a CD-ROM drive you can swap in and out. The Latitude LM P133ST comes with 16-bit onboard sound and good integrated stereo speakers, but a 28.8-kbps PC Card fax-modem costs extra.

The Latitude's design is classy and uncluttered, and the unit is very sturdy. The keyboard is well laid out, with large, full-travel keys. The only compromise is the <F1> through <F12> function keys, which are whittled down to about half the size of the other keys. The touchpad is smooth and responsive, allowing you to click either with the buttons or on the touchpad itself. Dell's service and reliability are good, according to our ongoing reader fax-back survey. And the policies are strong, including a three-year warranty on parts and one year on labor, a two-day factory repair turnaround policy, and 24-hour toll-free technical support. The documentation, both on-screen and printed, is thorough and well written.

2 DELL LATITUDE XPI P133ST

PRO: Fast, long battery life, good screen

CON: No internal CD-ROM drive option

If you don't need a CD-ROM drive in your power notebook, then the $4399 Dell Latitude XPi P133ST is your best choice. With a PC WorldBench score of 166, it is a fast portable. Its speed, 5.3-hour battery life, and 7.2-pound traveling weight make it a Best Buy.

Dell Latitude XPi

The XPi's Neo-Magic video chip has a fast 128-bit core and 1MB of embedded video RAM to accelerate applications. The crisp 11.3-inch active-matrix screen displays your work at 800 by 600 resolution. The Latitude is sturdy, but its keyboard is cramped and the trackball a bit unruly. Bundled software includes LapLink from Traveling Software and SideKick 95 from Starfish.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
6X	–	40	1	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	–	40	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
6X	–	72	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
6X	–	48	0	○	●	●	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
–	14.4	32	0	●	●	●	1/1	13	Sat.	BBS
–	–	40	0	○	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	28.8	80	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	28.8	48	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
4X	–	48	1	●	●	●	3/3	24	Sat., Sun.	AOL, CIS, Prodigy, WWW
6X	28.8	144	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	28.8	32	0	○	●	○	1/1	13	Sat.	BBS
–	–	24	0	○	○	●	1/1	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
6X	–	40	1	○	●	●	3/3	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	40	0	○	○	○	3/3	24	Sat., Sun.	AOL, BBS, CIS, Prodigy, WWW
–	–	40	1	●	●	○	1/1	14	–	AOL, BBS, CIS, WWW
–	–	40	0	○	●	○	1/1	24	Sat., Sun.	BBS, CIS, MSN, WWW
–	–	24	1	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
4X	–	40	0	○	●	●	1/1	9 [2]	–	BBS
–	–	40	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW

New This Month

The following PCs made our Power Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

3 COMPAQ LTE 5250

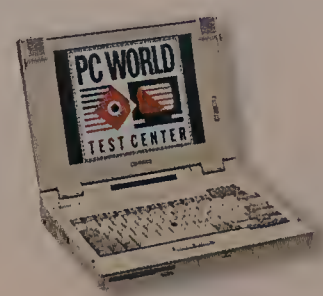
PRO: Fast, sturdy, good speakers, roomy keyboard, long battery life

CON: Stubborn mouse buttons; small, dull screen

You can always spot a Compaq LTE notebook because of its off-white case. Its sturdy design and impressive performance are also dead giveaways. The new $4198 Compaq LTE 5250 is one of the latest in a long line of well-built Compaq notebooks. It's a high-quality system that can handle all your mobile computing chores.

This P-120 is among the fastest in its class and comes with such high-end features as an infrared port, a modular 6X CD-ROM drive (a $399 option included in the price of our test unit), and built-in 16-bit stereo sound. Its keyboard is nice and roomy, with large, comfortable keys, and nice-sounding speakers are located at the top of the display for maximum audio projection.

Removing the battery and swapping the floppy drive for the CD-ROM drive are quick operations because the release levers are located on the sides of the notebook—you don't have to turn the system over to take things out.



Compaq LTE

To keep the price down, Compaq made a few compromises. For one thing, the LTE 5250 has a 10.4-inch active-matrix screen, which is small by today's power notebook standards. It can handle 800 by 600 resolution, but everything appears smaller. In addition, the screen lacks the brightness that we see in most other active-matrix displays.

The LTE 5250 also uses a NiMH battery instead of the more expensive lithium ion kind. Fortunately, you ▶

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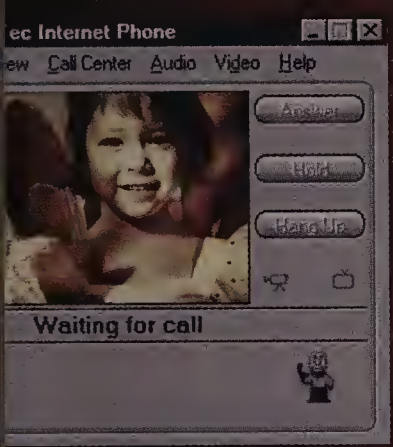
nternet phone *for the holidays.*

more than a phone call, it's a visit.



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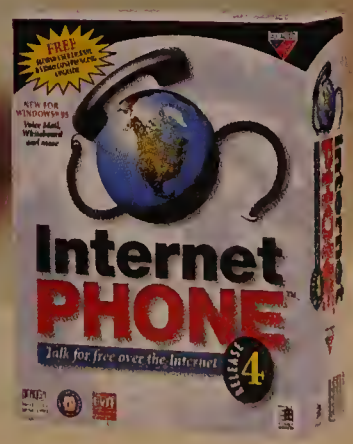


won't notice the cheaper battery. With Compaq's advanced power management, the LTE 5250 lasted close to 6 hours.

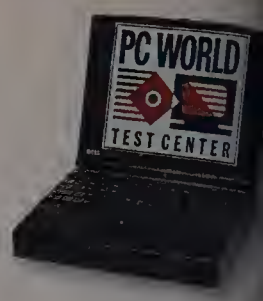
If you don't need an active-matrix screen, the $3398 Compaq LTE 5150 has an 11.3-inch dual-scan display. This P-100 notebook we tested is similar to its active-matrix sibling in many respects. It has the same features, it performs well, and it lasts for more than 4 hours.

4 DELL LATITUDE XPI CD P150ST

PRO: Great screen, combo CD-ROM/floppy drive

CON: Performs like a P-133 notebook

Hey, we thought the new Dell Latitude LM series of multimedia notebooks was the cream of the crop, too. But the company's latest XPi notebooks are newer and creamier. Question is, should you pay extra for something like the $4599 XPi CD P150ST? Maybe not. This machine, the first true Pentium-150 notebook we've tested for the Top 20, is actually slower than the top-ranked Latitude LM P133ST. In addition, its battery doesn't last as long. Both use a big, crisp 800 by 600 display and a Neo-Magic 128-bit graphics chip. Both ▶



Dell Latitude XPi CD

TOP 20 NOTEBOOK PCs — PERFORMANCE

	POWER NOTEBOOKS	CPU	RAM (MB)	Secondary cache (K)	PC WorldBench score
1	Dell Latitude LM P133ST*	Pentium-133	16	256	180
2	Dell Latitude XPi P133ST*	Pentium-133	24	256	166
3	Compaq LTE 5250	Pentium-120	16	256	149
4	Dell Latitude XPi CD P150ST	Pentium-150	16	256	166
5	WinBook XP5 P120	Pentium-120	16	256	145
6	IBM ThinkPad 560 P133	Pentium-133	16	–	146
7	IBM ThinkPad 760E	Pentium-133	24	256	177
8	NEC Versa 6030H	Pentium-133	16	256	174
9	Compaq Armada 4120T	Pentium-120	16	256	143
10	Toshiba Tecra 720CDT	Pentium-133	16	256	160
	BUDGET NOTEBOOKS				
1	Toshiba Satellite 100CS*	Pentium-75	8	–	86
2	WinBook XP5 P100*	Pentium-100	16	256	132
3	IBM ThinkPad 560 P100	Pentium-100	16	–	135
4	Toshiba Satellite Pro 420CDS	Pentium-100	16	–	142
5	AcerNote Light 356	Pentium-100	16	–	118
6	Digital HiNote VP	Pentium-100	16	–	139
7	Toshiba Satellite 110CT	Pentium-100	8	–	98
8	Austin Edge XP P100	Pentium-100	16	–	132
9	Broadax NP8662D	Pentium-120	16	256	141
10	Sharp PC-3030	Pentium-100	8	–	89

*Best Buy

Word 7.0 for Windows 95 · Excel 7.0 for Windows 95 · Picture Publisher 6.0 for Windows 95 · Paradox 5.0 for Windows · WordPerfect 6.1 for Windows · 1-2-3 release 5 for Windows

HOW WE TEST All systems are tested with PC WorldBench, PC World's application-based benchmark. A higher PC WorldBench score is better. All PCs have Windows 95, and video resolution is set to 800 by 600 in 256 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench score is a sum of the weighted result of each script: Word (25 percent), Excel (20 percent), Picture Publisher (15 percent), Paradox (15 percent), WordPerfect (15 percent), and 1-2-3 (10 percent). For more details on our benchmark and how we run it, see PC World Online (http://www.pcworld.com).

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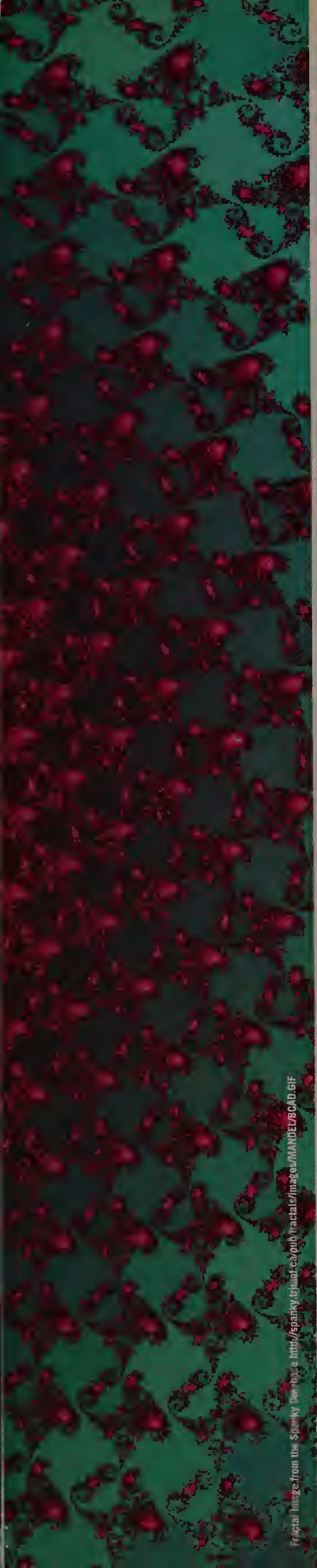

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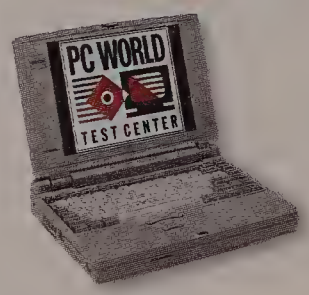
have CD-ROM drives. So why consider the XPi?

The new Latitude is a no-compromise multimedia notebook. Whereas the LM series can have a floppy or a CD-ROM drive, but not both, the XPi CD series has a combination floppy/CD-ROM drive. The screen can do 1024 by 768 resolution in a virtual desktop mode, and infrared ports in front and back allow for the most flexibility in wireless data transfer. The XPi does something else that's noteworthy: It attaches to Dell's PowerDock docking station, which provides a SCSI port and a network connection.



Toshiba

6 IBM THINKPAD 560 P133

PRO: Fast, highly portable, nice screen

CON: Display is vulnerable, so-so battery life

The notebook market is starting to resemble the fashion industry, where thin is always in. Last month IBM's ultraslim ThinkPad 560 P-100 took its place on our Budget Notebooks chart; this month the Pentium-133 version places on our Power chart. The new ThinkPad 560 P133 is ideal for those travelers who want power and mobility but also a big, bright screen.

IBM ThinkPad

At just 1.2 inches thin and 5 pounds light, the ThinkPad 560 P133 is easy on the shoulder. Yet it also has a dazzling 12.1-inch active-matrix screen. Keep in mind, though, that the ThinkPad 560's thin design means there's less casing to protect the display.

In its standard configuration, the ThinkPad 560 P133 comes with 8MB of RAM, but for our tests we had a $249 8MB upgrade module, bringing the total cost to $4448. The extra RAM gives the ThinkPad 560 P133 a needed performance boost, but it still doesn't make it a top-speed P-133. With a PC WorldBench score of 146, it's below average for its class. We also were a bit disappointed by the ThinkPad 560 P133's battery life of 2 hours, which is short for a top power notebook.

BUDGET NOTEBOOKS

This Month's Best Buys

1 TOSHIBA SATELLITE 100CS

PRO: Nice screen and keyboard, good bargain

CON: No bundled application software

The Toshiba Satellite 100CS is a perfect first notebook—inexpensive, reliable, and easy to use. Toshiba is phasing out the 100CS, but the company assures us you'll still be able to buy one when this review comes out. Just $1599 buys you a well-designed Pentium-75 portable. It doesn't have any of the extras you'll find on more expensive notebooks, but it's well built and comes from one of the most reputable vendors in the business.

The 100CS has a bright 10.4-inch dual-scan display and a comfortable, responsive keyboard. The best feature is the integrated AC adapter—all you have to carry around is a power cord.

Although it's fast for a notebook in its price range, the 100CS isn't a particularly impressive performer, because it comes with just 8MB of RAM. An 8MB upgrade module costs another $199. If you go to a computer store you can buy the Satellite 105CS, which is the same notebook except it comes with Microsoft Works 95.

2 WINBOOK XP5 P100

PRO: Nice screen, 28.8-kbps modem

CON: Small hard drive, only fair reliability

A price drop of $400 earns the WinBook XP5 P100 a Best Buy. This notebook is an especially good value, thanks to a couple of perks you don't usually find in a notebook in this price range: 16MB of RAM and a built-in modem. This 7.4-pound WinBook is also highly mobile, with a slim profile and a battery life of 5 hours. The keyboard has a snappy, comfortable feel, and the 10.4-inch dual-scan screen is crisp. However, the 543MB hard drive is skimpy by today's standards.

WinBook

As we were going to press, WinBook said it was planning to stop production of its XP5 line.

New This Month

The following PCs made our Budget Notebooks chart for the first time this month. For previously tested PCs on the chart, visit our Web page at http://www.pcworld.com/t20pcs.

10 SHARP PC-3030

PRO: Thin, lightweight, long battery life

CON: Sluggish for its CPU class, small hard drive

The Sharp PC-3030 is a thin, highly mobile notebook that stands out more because of its slim design and competitive price than its performance and features. This $2299 Pentium-100 notebook is less than 2 inches thick and weighs in at just under 7 pounds. Not only is it easy to take with you on the road, but it's also comfortable to use. We liked the PC-3030's responsive keyboard, and we were particularly impressed with its touchpad pointing device. The Sharp's 5-hour battery life makes it a perfect choice for business travelers.

Sharp

Unfortunately, the Sharp PC-3030's PC WorldBench score of 89 is more like that of a low-end Pentium-75 portable, mainly because it comes with only 8MB of RAM. An upgrade of an additional 8MB costs an extra $400—a decidedly steep price these days. Also disappointing is the Sharp notebook's dual-scan display. The 11.3-inch screen is roomy and handles 800 by 600 resolution, but it's remarkably dim and dull. ■

Beyond the Top 20

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Notebook PCs chart. For write-ups, see PC World Online (http://www.pcworld.com/t20pcsnaps).

- **Austin Edge Duet P133**
- **NEC Versa 4230**
- **Panasonic CF-62**
- **Samsung Sens 810**
- **WinBook FX P133**

Who needs it?

visioneer

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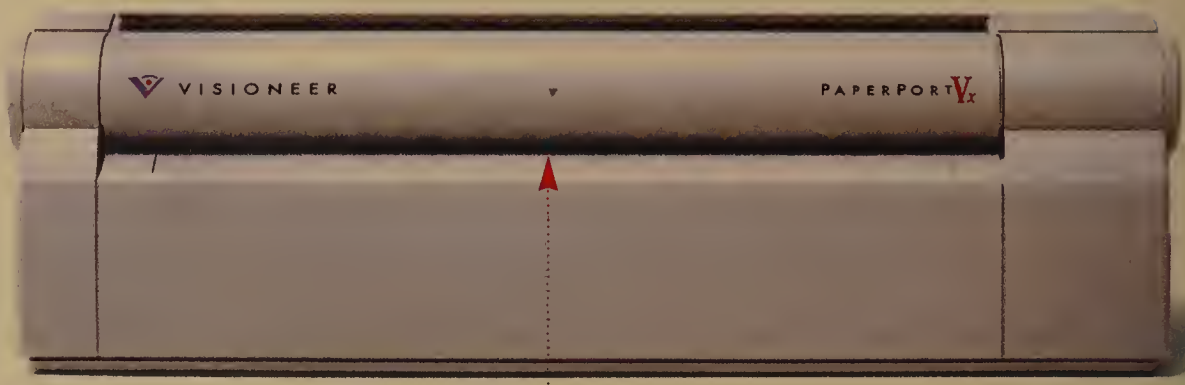

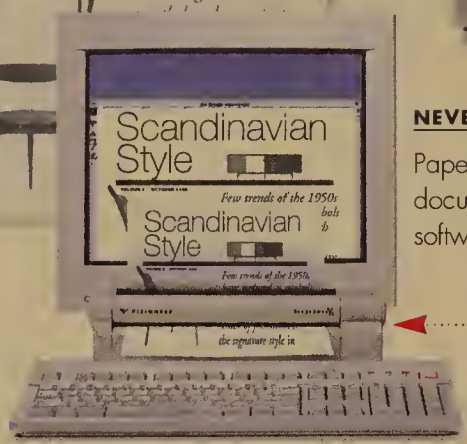

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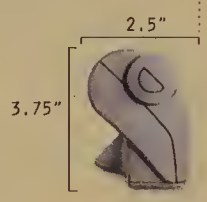

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Our PaperPort Deluxe™ Software (which is sold separately) enables you to do some other amazing things. It offers ScanDirect, which lets you scan a document directly into the application you want—and automatically adjusts PaperPort to the correct scan settings.

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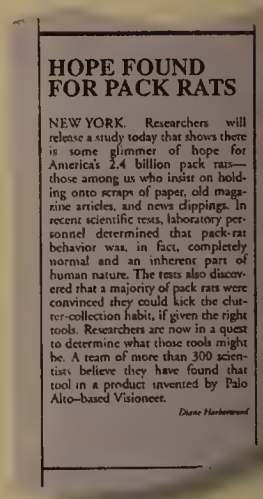


HOPE FOUND FOR PACK RATS

NEW YORK. Researchers will release a study today that shows there is some glimmer of hope for America's 2.4 billion pack rats—those among us who insist on holding onto scraps of paper, old magazine articles, and news clippings. In recent scientific tests, laboratory personnel determined that pack-rat behavior was, in fact, completely normal and an inherent part of human nature. The tests also discovered that a majority of pack rats were convinced they could kick the clutter-collection habit, if given the right tools. Researchers are now in a quest to determine what those tools might be. A team of more than 300 scientists believe they have found that tool in a product invented by Palo Alto–based Visioneer.

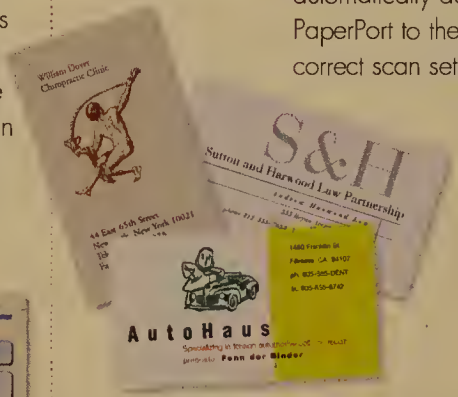
Diane Hardenwood

GET RID OF CLUTTER

Then there are all of those newspaper articles, financial statements, meeting notes, and Dear Binky columns you just can't bear to part with. You can use PaperPort to scan paper as long as 30 inches, and photos in up to 256 shades of gray. So you can save them forever, and get rid of the originals—with no remorse.

KEEP TRACK OF YOUR CONTACTS

Tired of forgetting people's names and numbers? Just scan business cards into PaperPort, and its CardScan SE™ software automatically creates an electronic card file of your business contacts.

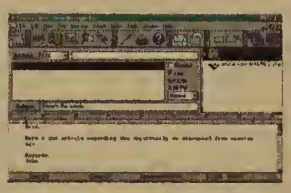


GET ORGANIZED WITH NESTED FOLDERS

Fully Windows 95 native, our PaperPort Deluxe Software lets you put folders into folders—up to 10,000 folders, five levels deep!

DEAL INTELLIGENTLY WITH PAPER

PaperPort helps you deal with all the paper in your life, so you never waste your time. Looking for a way to create an archive? Simply scan your precious documents, and file them electronically. Need to fill out a form? Buy Visioneer's FormTyper™ software. Like magic, it brings up the form on your computer and finds all the fields you need to fill out. All you have to do is tab from field to field, and type.



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Find a good tidbit about a competitor? Scan it into PaperPort and send it off to your colleagues using e-mail. Or send it over the Internet using Netscape Navigator. It's cheaper than conventional faxing, and a lot more private.

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RELIABILITY AND SERVICE SURVEY

Win a Dell Dimension P133v

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Dell Dimension P133v, a Pentium-133 PC in this month's Top 20. Send in a separate copy of the survey for each of your PCs.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 12-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by December 31.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.

HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ Compudyne
○ Computrend ○ Comtrade ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Future Tech ○ Gateway 2000
○ Hewlett-Packard ○ HiO ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro
○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp ○ Swan
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ Vektron ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop ○ Notebook/laptop ○ Handheld

What is the CPU?
○ PowerPC ○ Pentium ○ 80486 ○ 80386 ○ Other

Where did you buy this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home electronics store ○ Retail store ○ Value-added reseller ○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week ○ 1-2 weeks ○ 3-4 weeks ○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR ○ Staff computer technician ○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Answer for the most recent problem—*other than DOA*—not reported in a prior survey.

When did this problem occur? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 91	○ 93	○ 95
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 92	○ 94	○ 96

How long after you purchased your PC did the problem occur?
○ Less than 1 month ○ 1-3 months ○ 4-6 months ○ 7-12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer ○ Dealer/store where purchased ○ Manufacturer's authorized repair technician ○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1-2 minutes ○ 3-5 minutes ○ 6-10 minutes ○ 11-20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes-1 hour ○ 2-5 hours ○ 6-10 hours ○ 11-24 hours ○ 1½-2 days ○ 3-5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1-2 days ○ 3-7 days ○ 8-14 days ○ 15-30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was it resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

PLEASE FAX TO 415/357-4522. FOR BEST RESULTS, PHOTOCOPY THIS PAGE.

Circle 61 on reader service card

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PC WORLD

TOP 10 PRINTERS

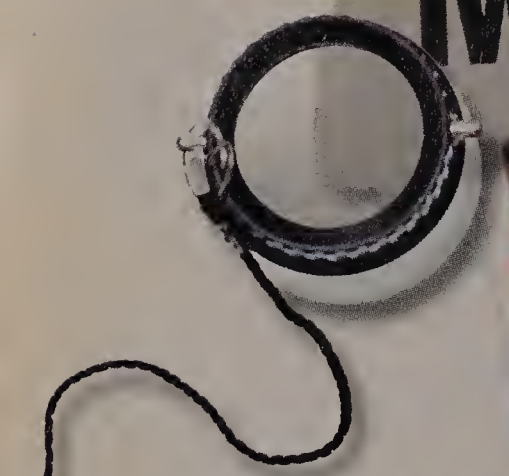
	MONOCHROME PERSONAL PRINTERS	Month tested	Street price (8/23/96)	Overall rating	Speed for plain text	Speed for full-page graphics	Comments	Reader service number
1	Panasonic KX-P6100 800/742-8086 http://www.panasonic.com	Apr 96	$399	86	5.7 ppm	2.3 ppm	**FEATURES:** 6-ppm laser. Standard 256K of RAM, 1200-by-300-dpi maximum resolution, 100 sheets input, 50 output. **PRO/CON:** Low price, quicker than most competitors, space-saving tower design, excellent print quality for 300-dpi resolution. No manual feed slot for envelopes.	697
2	Brother HL-720 800/267-7746 http://www.brother.com	new	$350	84	5.4 ppm	1.1 ppm	**FEATURES:** 6-ppm laser. Standard 512K of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 100 output. **PRO/CON:** Low price, good performance, straighter paper path helps prevent jams, includes Surf 'n Print utility for printing Web pages. Takes up a lot of space when you unfold the output tray.	698
3	NEC SuperScript 860 800/632-4636 http://www.nec.com	Aug 96	$499	84	6.9 ppm	1.7 ppm	**FEATURES:** 8-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 200 sheets input, 50 output. **PRO/CON:** Fastest laser on chart; comes with slick software that makes it easy to print booklets, posters, and more. Most expensive on chart; gray-scale output is so-so.	699
4	Panasonic KX-P6500 800/742-8086 http://www.panasonic.com	retested this month	$449	83	5.4 ppm	1 ppm	**FEATURES:** 6-ppm laser. Standard 512K of RAM, 2400-by-600-dpi maximum resolution, 100 sheets input, 50 output. **PRO/CON:** Competitive performance, space-saving tower design, 600-dpi engine gives it slightly crisper text than the 300-dpi KX-P6100. No manual feed slot for envelopes.	700
5	HP LaserJet 5L Xtra 800/752-0900 http://www.hp.com	new	$479	81	3.9 ppm	0.7 ppm	**FEATURES:** 4-ppm laser. Standard 1MB of RAM, 600-by-600-dpi maximum resolution, 100 sheets input, 100 output. **PRO/CON:** Great-looking text and graphics, easy to use, generous CD-ROM bundle. Input tray lets you load envelopes without removing paper. Compact footprint. But it's slow considering the price.	701
	COLOR PERSONAL PRINTERS							
1	Epson Stylus Color 500 800/463-7766 http://www.epson.com	new	$279	79	1.7 ppm	0.4 ppm	**FEATURES:** 4-ppm monochrome/1-ppm color ink jet. 720-by-720-dpi maximum resolution, 100 sheets input, 30 output. Accepts both black and color cartridges. **PRO/CON:** Impressive speed, print quality, and cost per page; two-year warranty. Lacks a manual feed slot; CD-ROM bundle is good but not great.	–
2	Canon BJC-4200 800/848-4123 http://www.ccsi.canon.com	new	$279	78	1.1 ppm	0.2 ppm	**FEATURES:** 5-ppm monochrome/1-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input, 100 output. Accepts both black and color cartridges. **PRO/CON:** Software bundle lets you print everything from business brochures to storybooks. Overall print quality and speed lag behind the Epson's.	702
3	HP DeskJet 820Cse 800/752-0900 http://www.hp.com	retested this month	$389	77	3.8 ppm	0.3 ppm	**FEATURES:** 5-ppm monochrome/1.5-ppm color ink jet. 600-by-600-dpi maximum resolution, 150 sheets input, 50 output. Accepts both black and color cartridges. **PRO/CON:** Very good print quality, excellent paper handling, best monochrome print speed. Does only a fair job with photographic images.	703
4	HP DeskJet 693C 800/752-0900 http://www.hp.com	new	$349	77	1.7 ppm	0.3 ppm	**FEATURES:** 3-ppm monochrome/0.8-ppm color ink jet. 600-by-600-dpi maximum resolution, 100 sheets input, 100 output. Accepts both black and color cartridges. 690C is same printer without software. **PRO/CON:** Optional kit provides best photo quality of any DeskJet; easy to use. No toll-free support.	704
5	Canon BJC-240 800/848-4123 http://www.ccsi.canon.com	new	$179	77	1.1 ppm	0.2 ppm	**FEATURES:** 4-ppm monochrome/0.3-ppm color ink jet. 720-by-360-dpi maximum resolution, 100 sheets input. Swaps black and color cartridges. **PRO/CON:** Same software and photo kit option as BJC-4200. Single-cartridge design is inconvenient and hurts print quality. No output tray.	705

Best Buy http://www.pcworld.com/t10printers Windows 95-certified Plug and Play All products: 908

HOW WE TEST The overall rating for both monochrome and color personal printers is based on print quality (27 percent), price (20 percent), speed (20 percent), features and ease of use (15 percent), service and support (13 percent), and cost of consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

'TIS THE SEASON for new personal printers to hit the stores—and the charts—with new models available from Brother, Canon, Epson, and HP. The new Epson Stylus Color 500 wins our color Best Buy, while the Panasonic KX-P6100 remains the monochrome Best Buy. The roundup "Personal Printers: Great Values for Every Budget" (page 161) also reviews a Lexmark monochrome laser and a $299 LED printer from Okidata. ■

Two Names. One Ideal.



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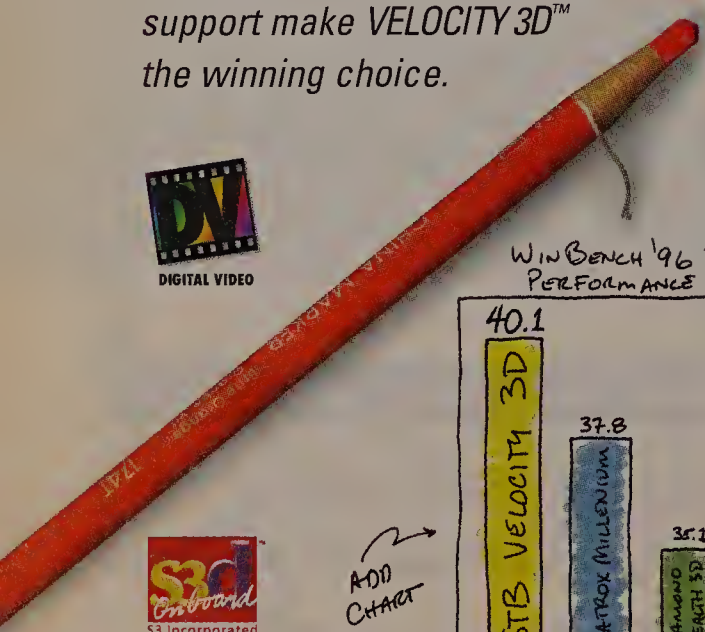
DIGITAL VIDEO



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†WinBench 96 1.0 tests conducted on a Gateway 2000 (model P5-166,w/Windows95) 166MHz Pentium, PCI 2.0 Bus, 512KB Pipeline cache, 16MB EDO DRAM, Caviar IDE HD, 1024x768 with 65,000 colors at 75Hz refresh. STB VELOCITY 3D™, Matrox Millennium, and Diamond Stealth 3D 2000 were tested using driver versions 1.23, 4.03.00.3110 and 4.02.12 respectively. Prices and specifications subject to change without notice.

Circle 210 on reader service card

PC WORLD

TOP 10 MONITORS

	15-INCH MONITORS	Month tested	Street price (9/1/96)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Samsung SyncMaster 15GLi 800/933-4110 http://www.sosimple.com	Oct 95	$408	81	very good/ good	**FEATURES:** 13.6-inch viewable screen, .28mm dot pitch tube, up to 100-Hz refresh rate [1], Level 2b Plug and Play ready [2], color and image adjustment software, three-year warranty, 24-hour daily toll-free support. **PRO/CON:** Low price, very sharp text and graphics, ample on-screen menus, easy to adjust; small viewable screen.	687
2	Dell UltraScan 15TX 800/289-3355 http://www.dell.com	Feb 96	$399	80	very good/ very good	**FEATURES:** 13.8-inch viewable screen, .26mm Trinitron tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, three-year warranty, 24-hour daily toll-free support. **PRO/CON:** $25 price cut, very sharp text across entire screen, vivid color graphics, uniform screen brightness, easy-to-use menus; faint line across screen.	688
3	Mitsubishi Diamond Scan 15HX 800/843-2515 http://www.mitsubishi-display.com	June 96	$450	80	very good/ very good	**FEATURES:** 13.9-inch viewable screen, .28mm dot pitch tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, color and image correction software, three-year warranty, 8.5-hour weekday toll-free support. **PRO/CON:** Very sharp text, detailed graphics, ample on-screen menus; no manual degauss, awkward control buttons.	689
4	Mitsubishi Diamond Scan 15VX 800/843-2515 http://www.mitsubishi-display.com	Oct 96	$410	79	good/ good	**FEATURES:** 13.8-inch viewable screen, .28mm dot pitch tube, up to 90-Hz refresh rate [1], Level 2b PnP ready, color and image correction software, three-year warranty, 8.5-hour weekday toll-free support. **PRO/CON:** Detailed text and graphics, ample on-screen menus; no degauss button to demagnetize tube manually.	690
5	Panasonic PanaMedia 15 800/742-8086 http://www.panasonic.com	June 96	$429	78	very good/ good	**FEATURES:** 14-inch viewable screen, .27mm dot pitch tube, up to 107-Hz refresh rate [1], speakers and mike, Level 2b PnP ready, three-year warranty, 24-hour daily toll-free support. **PRO/CON:** $70 price drop, big screen, very sharp text, ample on-screen controls, easy to adjust; screen is a little less bright in the corners.	691
6	Eizo-Nanao FlexScan FX-B5 800/800-5202 http://www.eizo.co.jp/welcome	new	$575	78	very good/ very good	**FEATURES:** 13.6-inch viewable screen, .28mm dot pitch tube, up to 110-Hz refresh rate [1], Level 2b PnP ready, three-year warranty. **PRO/CON:** Tiny text and spreadsheet cells are razor sharp, realistic color graphics quality, comprehensive on-screen menus, easy to adjust, TCO-95 low-emissions approved; very expensive.	692
7	MAG InnoVision DX15T 800/827-3998 http://www.maginnovision.com	Aug 96	$419	78	very good/ very good	**FEATURES:** 13.9-inch viewable screen, .25mm Trinitron tube, up to 85-Hz refresh rate [1], Level 2b PnP ready, three-year warranty. **PRO/CON:** Low price, text and spreadsheet cells are easy to read, realistic color graphics quality; navigating on-screen menus requires repetitive button pushing, faint line across screen.	693
8	NEC MultiSync XV15+ 800/632-4636 http://www.nec.com	June 96	$479	77	good/ very good	**FEATURES:** 13.5-inch viewable screen, .28mm dot pitch tube, up to 103-Hz refresh rate [1], Level 2b PnP ready, color calibration software, three-year warranty. **PRO/CON:** Easy to adjust, very detailed graphics; slightly blurred text along left side of screen, no on-screen menus or adjust gauges, small viewable screen.	694
9	ViewSonic Optiquest V655 800/888-8583 http://www.viewsonic.com	new	$345	77	very good/ good	**FEATURES:** 13.6-inch viewable screen, .28mm dot pitch tube, up to 104-Hz refresh rate [1], Level 2b PnP ready, three-year parts/one-year labor warranty, 11-hour weekday toll-free support. **PRO/CON:** Lowest price on chart, very crisp text detail; screen adjustments require repetitive button pressing, no image tilt control.	695
10	ADI Microscan 4V 800/228-0530 http://www.adi-online.com	Oct 96	$379	77	very good/ very good	**FEATURES:** 13.7-inch viewable screen, .28mm dot pitch tube, up to 100-Hz refresh rate [1], Level 2b PnP ready, two-year warranty. **PRO/CON:** Terrific price, letters and Web pages are easy to read, simple dials for adjusting contrast and brightness; limited controls beyond making basic adjustments, no on-screen menus.	696

Best Buy http://www.pcworld.com/t10monitors All products: 907

[1] Highest refresh rate at 800 by 600 resolution. [2] Level 2b Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, spreadsheets, Web pages, and scanned images. The overall rating is based on price (30 percent), features and ease of use (25 percent), text and graphics quality (20 percent each), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

EVERY LITTLE BIT HELPS. A $25 reduction inches Dell's UltraScan 15TX into our second Best Buy slot, while a $70 cut boosts Panasonic's PanaMedia 15 to fifth. Two new units debut this month: the $575 Eizo-Nanao FlexScan FX-B5 in sixth, and the $345 ViewSonic Optiquest V655 in ninth. Eizo-Nanao's forte is sharp text and graphics and intuitive controls. The ViewSonic isn't as complete, but it's got a tempting low price. ■

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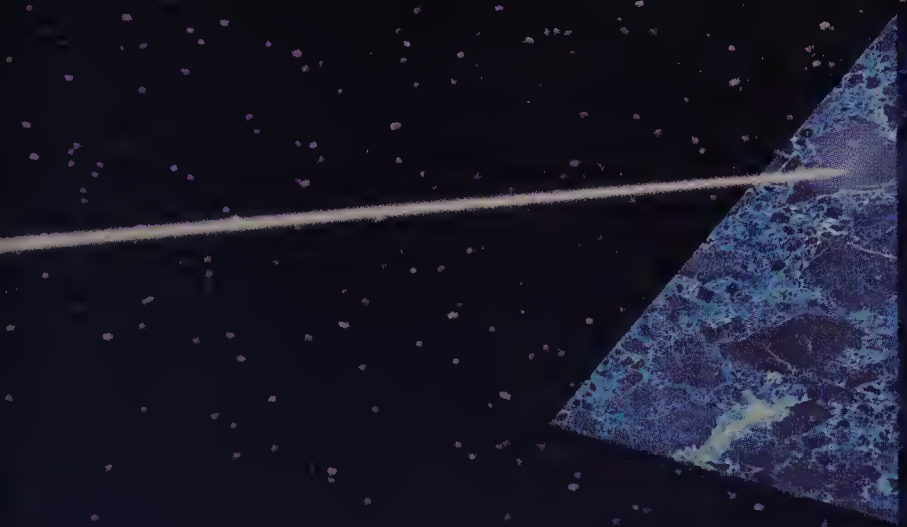

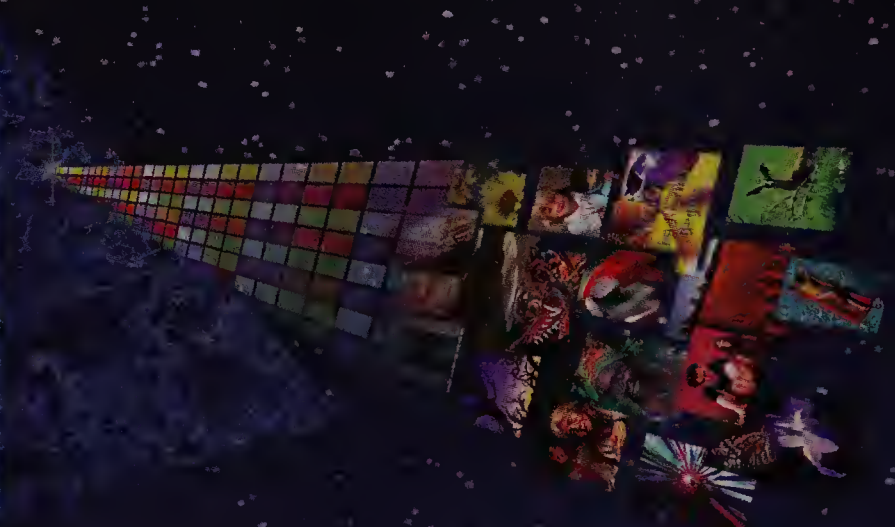

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PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARD	Month tested	Street price (9/11/96)	Overall rating	PC WorldBench graphics score	Comments	Reader service number
1	Matrox Mystique 800/361-1408 http://www.matrox.com/mga	new	$179	98	181 very good	**FEATURES:** 2MB of SGRAM, 130-Hz refresh rate at 1024 by 768, 3-D software and acceleration, optional MPEG and TV tuner cards, Compcore MPEG software, DirectVideo, Direct3D, MGA-1064SG chip. **PRO/CON:** Best 3-D performance and quality, good for gamers, good AVI and MPEG video playback; refresh rates hard to set.	661
2	STB Lightspeed 128 888/234-8750 http://www.stb.com	Aug 96	$179	97	186 very good	**FEATURES:** 2.25MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bilinear video interpolation, DirectVideo, Xing MPEG software, Tseng Labs ET6000 chip. **PRO/CON:** $20 price drop, performs well in business and graphics programs, perfect AVI video playback, excellent MPEG, lifetime warranty; no 3-D acceleration.	662
3	VideoLogic GrafixStar 600 800/578-5644 http://www.videologic.com	Oct 96	$159	96	185 very good	**FEATURES:** 2MB of MDRAM, 120-Hz refresh rate at 1024 by 768, bundled multimedia apps, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. **PRO/CON:** Fast with business and graphics programs, inexpensive, excellent utilities, top-notch AVI and MPEG video; no 3-D acceleration.	663
4	Hercules Terminator 3D 800/532-0600 http://www.hercules.com	new	$189	96	184 very good	**FEATURES:** 2MB of EDO DRAM, 90-Hz refresh rate at 1024 by 768, 3-D acceleration, Xing MPEG software, S3 Virge chip, optional MPEG card. **PRO/CON:** Fast in Windows business applications, handles basic 3-D graphics well, excellent AVI and MPEG video playback, toll-free support; poor documentation.	664
5	Matrox Millennium 800/361-1408 http://www.matrox.com/mga	June 96	$199	95	184 very good	**FEATURES:** 2MB of WRAM, 120-Hz refresh rate at 1024 by 768, 3-D acceleration, 3-D software, Compcore MPEG software, DirectVideo, MGA-2064W chip, optional MPEG and TV tuner cards. **PRO/CON:** Huge $70 price drop, fast, superb AVI video; watch for slower refresh rates in version shipped with some PCs.	665
6	Diamond Stealth 3D 2000XL 800/468-5846 http://www.diamondmm.com	Sept 96	$169	95	183 very good	**FEATURES:** 2MB of EDO DRAM, 100-Hz refresh rate at 1024 by 768, 3-D acceleration, bundled games, Mediamatics MPEG software, DirectVideo, S3 Virge chip. **PRO/CON:** $10 price drop, Diamond's InControl Tools make changing video setting easy, excellent MPEG playback; tech support can be hard to reach.	666
7	Hercules Dynamite 128/Video 800/532-0600 http://www.hercules.com	Nov 96	$179	94	185 very good	**FEATURES:** 2MB of MDRAM, 90-Hz refresh rate at 1024 by 768, bilinear video interpolation, Xing MPEG software, DirectVideo, Tseng Labs ET6000 chip. **PRO/CON:** $50 price drop, handles business and graphics programs equally well, nice utilities, toll-free support; weak documentation, no 3-D acceleration.	667
8	Orchid Fahrenheit Video 3D 800/577-0977 http://www.orchid.com	new	$199	93	187 very good	**FEATURES:** 2MB of EDO DRAM, 110-Hz refresh rate at 1024 by 768, 3-D acceleration, Xing MPEG software, S3 Virge chip, optional MPEG and TV tuner cards. **PRO/CON:** Easy to use, good software utilities and manual, fastest board by a hair; not so good with AVI video playback, poor MPEG quality.	668
9	ATI 3D Xpression 905/882-2600 http://www.atitech.ca	Sept 96	$159	91	174 good	**FEATURES:** 2MB of EDO DRAM, 100-Hz refresh rate at 1024 by 768, 3-D acceleration, ATI MPEG software, ATI 3D Rage chip, optional MPEG and TV tuner cards. **PRO/CON:** Affordable all-in-one graphics board with 3-D functions, good MPEG playback; not ideal for high resolutions.	669
10	STB Powergraph 64 Video 888/234-8750 http://www.stb.com	June 96	$129	91	175 good	**FEATURES:** 2MB of EDO DRAM, 120-Hz refresh rate at 1024 by 768, Xing MPEG software, S3 Trio64V+ chip, optional MPEG and TV tuner cards. **PRO/CON:** Low price, fast at 1024 by 768, good MPEG playback, lifetime warranty, toll-free support; not powerful enough for image editing or desktop publishing.	670

Best Buy http://www.pcworld.com/t10graphics Windows 95-certified Plug and Play All products: 904

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors (reported here) and at 1024 by 768 and 65,536 colors. Boards were tested in a Dell Dimension XPS P133c with 16MB of EDO DRAM and 256K of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

BOARDS THAT SPEED UP 3-D graphics not only enhance special effects, they also handle regular Windows programs well. All three newcomers are both graphics and 3-D accelerators. Our new leader, the $179 Matrox Mystique, is a great board with the best 3-D to date. The $189 Hercules Terminator 3D and the $199 Orchid Fahrenheit Video 3D handle basic 3-D, are speedy in business programs, and come with good software utilities. ■

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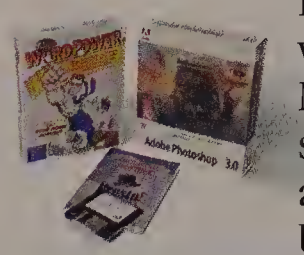

If you need a scanner that combines high performance and maximum value, may we suggest a little head-to-head competition. UMAX vs HP? Unfair comparison? Maybe for them. UMAX has a reputation for offering advanced, award-winning scanners at prices that make good business sense. Plus, our software bundles are unmatched, even by the big boys. So why monkey around? Compare the UMAX Vista S-12 with the HP ScanJet 4c and decide for yourself.

Compare	UMAX Vista S-12	HP ScanJet 4c
Image editor software	✔ Adobe Photoshop Full	Photopaint
Presentation software	✔ ASAP Word Power	None
Maximum DPI	✔ 9600	2400
Bit depth	✔ 33-bit[1]	30-bit
Scanning speed (5" x 7" color photo)	✔ 18 sec.	42 sec.
Lamp	✔ Cold cathode - lasts longer	Fluorescent
Tech support	✔ Toll free	No 800 number
Price	✔ $699[2]	$ 938[3]

UMAX Vista S-12

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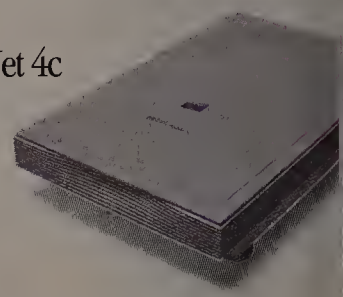

[1] 33-bit equivalent with the analog gamma correction. [2] Estimated street price after $50 mail-in rebate. [3] Average street price from sampled advertisements in Computer Shopper Sept. 1996.

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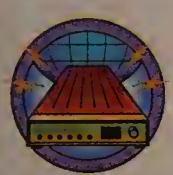
PC WORLD

TOP 10 MODEMS

	INTERNAL DESKTOP MODEMS	Month tested	Street price (9/15/96)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	U.S. Robotics Sportster Voice 28.8/33.6 Faxmodem 800/342-5877 http://www.usr.com	new	$179	78	2:41	**FEATURES:** 33.6-kbps, 8-bit card, Fax Class 1 and 2.0 (standard), Distinctive Ring, QuickLink Message Center voice/fax/data software, full-duplex speakerphone. **PRO/CON:** Stellar performer, nice feature set; installation instructions in manual a little vague, specific model wasn't listed in Win 95 driver list.	676
2	Cardinal MVP288IS 800/775-0899 http://www.cardtech.com	Nov 96	$189	77	2:48	**FEATURES:** 28.8-kbps, 8-bit card, full-duplex speakerphone and mike, MNP-10EC cellular protocol, FlashROM, VoiceView, voice mail, FaxWorks 3.0, lifetime warranty. **PRO/CON:** One of the best feature sets we've seen, installation was a breeze; one of the most expensive modems on chart.	677
3	Zoom V.34I Plus Model 2805 800/631-3116 http://www.zoomtel.com	new	$119	77	2:51	**FEATURES:** 33.6-kbps, 8-bit card, V.FC, MNP-10EC, Comit and WinFax Lite software, seven-year warranty, 14.5 hours of tech support per weekday. **PRO/CON:** Attractively priced, great service and support policies; middle-of-the-pack performance, installation was not flawless.	678
4	Logicode Quicktel 28800 V.34 DSVD 800/735-6442 http://www.logicode.com	new	$189	77	2:44	**FEATURES:** 33.6-kbps, 8-bit card, V.FC, QuickLink Message Center software, VoiceView, lifetime warranty. **PRO/CON:** Solid performer packed with features including FlashROM upgradability, a full-duplex speakerphone, and Digital Simultaneous Voice Data; pricey.	679
5	Hayes Total Internet Solution 770/840-9200 http://www.hayes.com	Nov 96	$163	76	2:54	**FEATURES:** 28.8-kbps, 16-bit card, V.FC, Distinctive Ring, SmartCom Message Center LE fax/data software, toll-free tech support. **PRO/CON:** One of the best packages for getting up on the Internet quickly, very good support policies; sluggish performer, documentation was lacking.	680
6	Motorola ISG Online Surfr 800/426-6336 http://www.mot.com/modems	new	$140	76	2:48	**FEATURES:** 28.8-kbps, 8-bit card, QuickLink II data/fax software, toll-free support. **PRO/CON:** Flawless installation, one of the few modems with toll-free tech support; pricey for such minimal features, didn't perform nearly as well as the modem it replaces, the Motorola LifeStyle 28.8.	681
7	Microcom DeskPorte 28.8S 800/822-8224 http://www.microcom.com	Nov 96	$120	76	2:47	**FEATURES:** 28.8-kbps, 8-bit card, V.FC, MNP-10EC cellular protocol, Distinctive Ring, FaxWorks 3.0, five-year warranty, tech support available 12 hours per weekday. **PRO/CON:** Attractive price, friendly documentation; card is not Plug and Play, has Distinctive Ring capability but little else for features.	682
8	Hayes Total Gaming Solution 770/840-9200 http://www.hayes.com	Nov 96	$259	75	2:47	**FEATURES:** 28.8-kbps, 16-bit card, V.FC, voice mail, DSVD, VoiceView, full-duplex speakerphone, Distinctive Ring, Caller ID, toll-free support. **PRO/CON:** Painless installation, extensive support for voice/data line sharing, comes with ample software bundle; most expensive package on chart.	683
9	E-Tech/Bullet Telecom Bullet PC288MX 800/328-5538 http://www.bulletel.com	Nov 96	$152	75	2:42	**FEATURES:** 28.8-kbps, V.32ter, 8-bit card, Comit Lite for Windows and WinFax Lite, two-year warranty, toll-free tech support, overnight replacement. **PRO/CON:** Above-average speed, decent price; minimal documentation, minimal feature set, installation could require a call to tech support.	684
10	Boca Bocamodem V.34 28800bps 561/997-7202 http://www.bocaresearch.com	Nov 96	$179	75	2:44	**FEATURES:** 28.8-kbps, V.FC, 8-bit card, FaxWorks 3.0, five-year warranty, 10.5 hours per weekday of technical support. **PRO/CON:** A little faster than average, manuals are understandable; pricey for a non-Plug and Play modem that doesn't come with any extras like security features or Distinctive Ring capability.	685

Best Buy http://www.pcworld.com/t10modems Windows 95-certified Plug and Play All products: 906

HOW WE TEST We test a pair of identical modems on a simulated phone network. For the phone line test, we send a text file over 55 line conditions. For the file type test, we send five files—a graphics, text, program, and compressed file, and a mixture of those four file types—over one line condition. We average the results of the two tests. The overall rating is based on performance (43 percent), features (26 percent), price (12 percent), support (10 percent), and ease of use (9 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



FOUR NEW MODEMS appear on this month's chart, with the U.S. Robotics Sportster Voice 28.8/33.6 Faxmodem debuting at number one, replacing Motorola's discontinued LifeStyle 28.8. We retested the Sportster with the patch to fix the bug we reported in October's *Bugs and Fixes* column, and it remained the best performer of the bunch. The Sportster's voiceless sibling, the $159 Sportster Faxmodem, is also a good buy. ■

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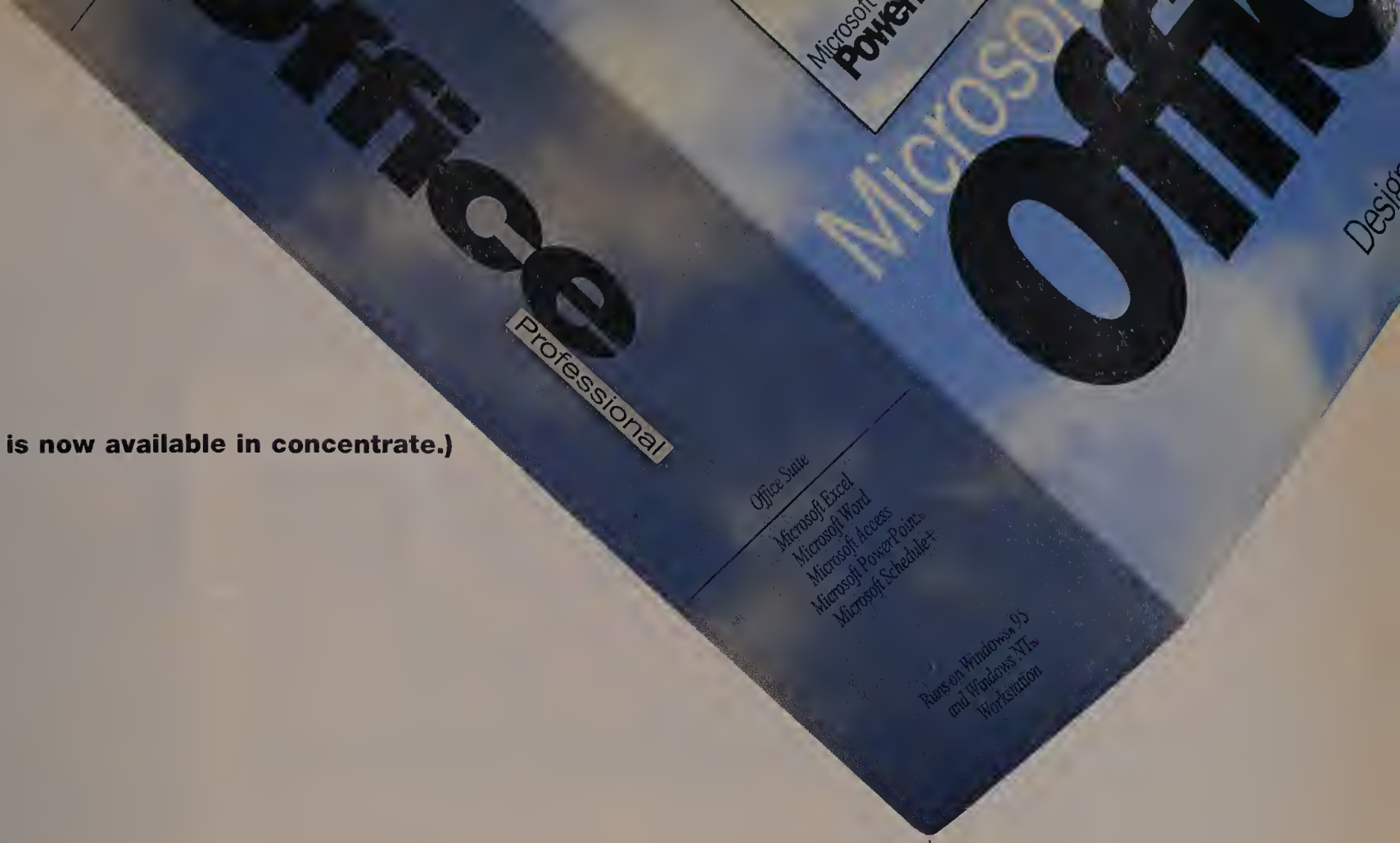

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Larry Bowdish, Publishing Executive, 37; Of Massive Hard Drive Failure

By SIMON BOWDEN

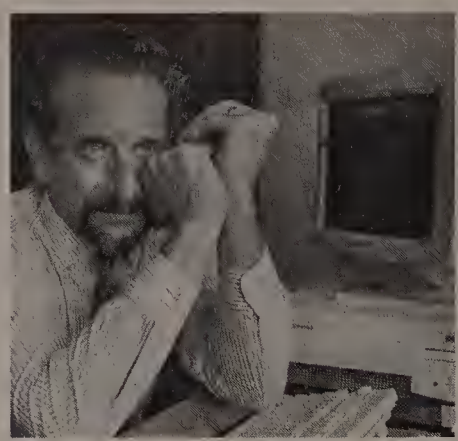
He was the envy of the textbook publishing crowd. The bad boy of the scholastic set. Witty, urbane, and outspoken, Larry Bowdish lit up a sleepy industry with his meteoric rise to the top, but the ride ended suddenly late last night, when he suffered a devastating system collapse during final manuscript edits.

Mr. Bowdish's sudden demise came as a shock to friends, who recalled a man known for his boundless energy and enthusiasm.

"One minute you've got the world by the tail and the next...you've been erased."

"Naturally, we're all a little stunned," said Information Services Director David B. Cohen, "after all, we do encourage employees to save their work every chance they get." Said another colleague, "It's so unfair. I mean, one minute you've got the world by the tail and the next, you've been erased."

Officials have since traced the system collapse, reconstructing Bowdish's last hours and desperate attempts at retrieval. It now appears Mr. Bowdish was downloading from corporate archives onto his workstation, and periodically dumping onto floppy disks. "People can use floppies as backups, but there's an obviously limited capacity. Besides, Bowdish was making changes straight onto the disks without keeping track of his



Larry Bowdish

changes. So, searching for lost data becomes a moot point," explained Cohen.

Mr. Bowdish, who had no known history of hard drive failure, leaves no surviving software. In lieu of flowers, the family kindly requests all leads and reasonable job offers be forwarded to the home address.

Nancy Conaty, 34, Accidentally Trashed by Four-year-old Son

By SIMON BOWDEN

Mrs. Nancy Conaty was sole proprietor of an executive search firm run out of the home. The end came in a tragic family accident late Thursday afternoon. Mrs. Conaty had apparently walked into the kitchen to check on a pot roast when son Joey dragged her unsaved document into the trash, then pounded unknown commands on the keyboard.

The computer was rushed to a neighborhood computer store where specialists struggled frantically for several hours to retrieve the lost work. Their attempts were in vain, as the damage was much too widespread. "Had this occurred with a safe backup in place, no big deal," the store manager shrugged. "But there's very little we can do in a case like this."

Mysterious DOS Virus Claims Famous Accountant

By SIMON BOWDEN

Stephen Cunningham, known affectionately in accounting circles as the Bulldog of Due Diligence, was found not at his desk yesterday morning.

His untimely exit from Simon Co. coincided with the discovery of corrupted files on the largest merger and acquisition project in the history of the firm. It wasn't known whether the data disappearance alone caused Cunningham's sudden departure. However sources revealed that the ex-Senior Vice President's lengthy battle with a mysterious DOS virus was well documented within the firm.

"The Tech Support guys were down here all the time," said long-time assistant Jane Deery. "Steve was always getting these weird system bombs, it was bizarre. But he had an amazing memory and was usually able to re-create whatever was lost."

Stephen Cunningh

Since the information was so imp tant, it's a mystery why the depart didn't back up his hard drive.

Ms. Deery added Mr. Cunningh declined a traditional going aw party, wishing instead to "just get with things."

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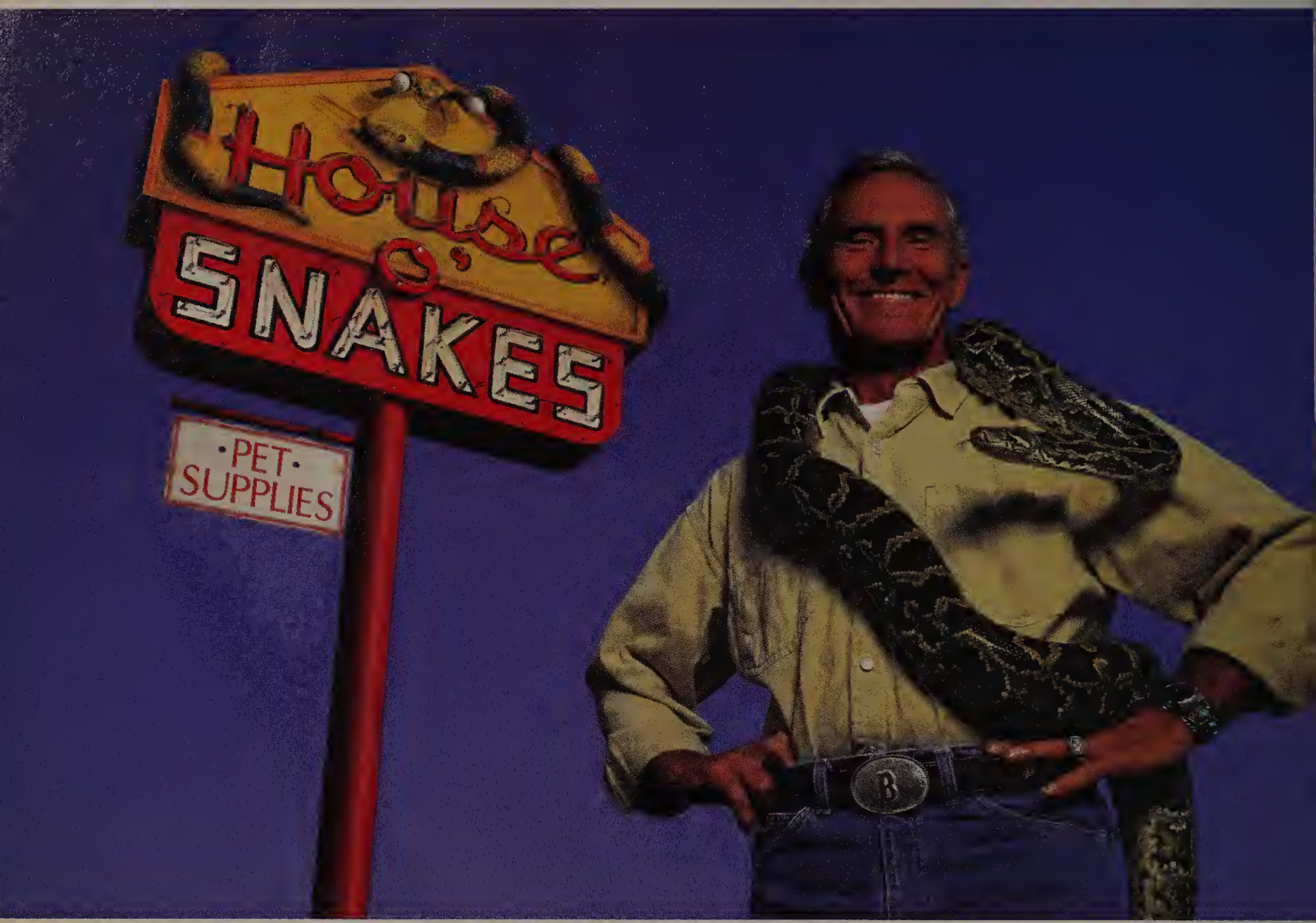

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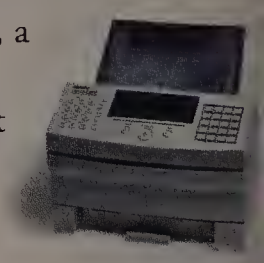

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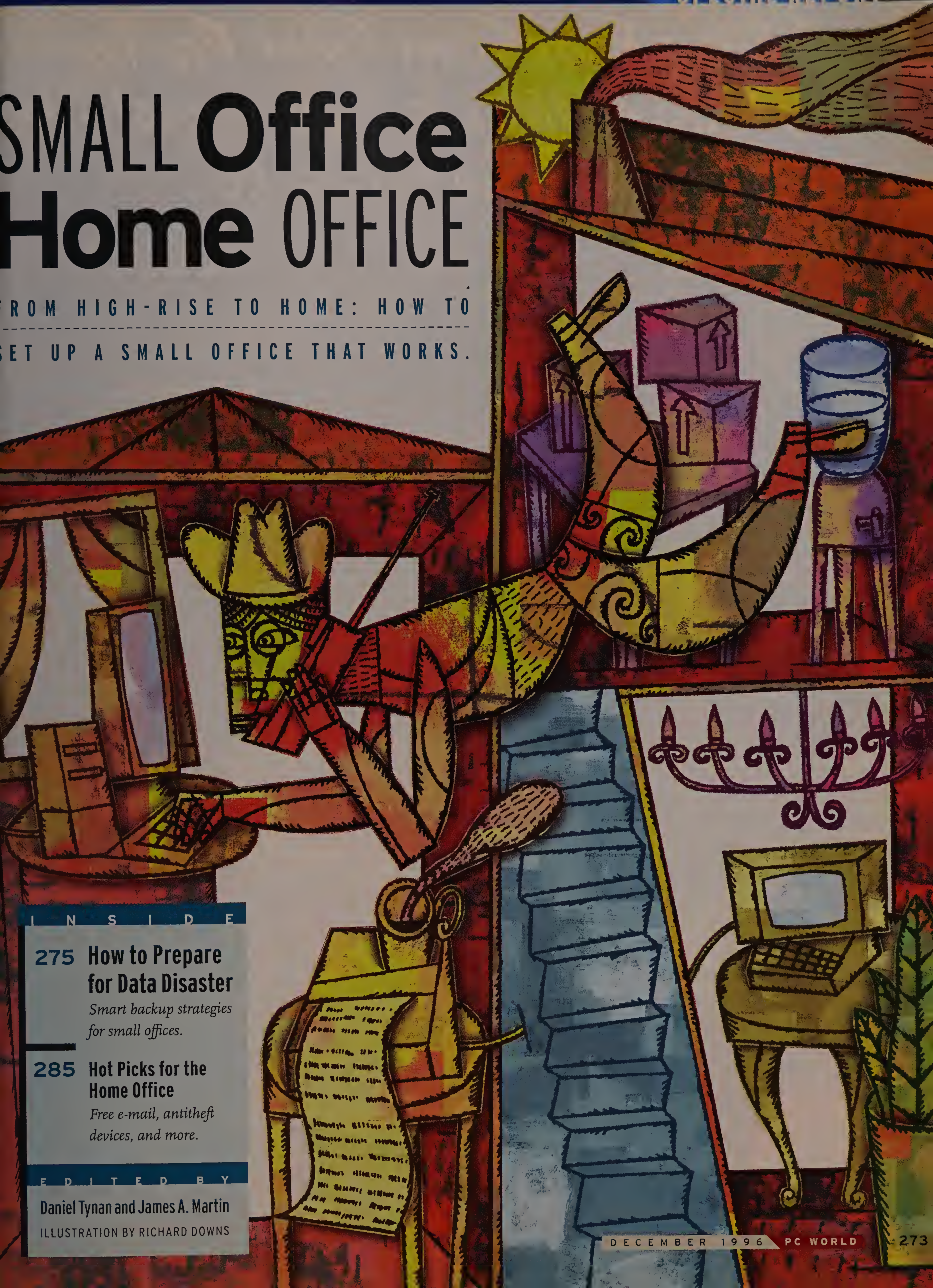

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How to PREPARE for Data Disaster

Not backing up can cause severe data damage. Here's how to protect the most important part of your business.

BY MIKE HOGAN

BACKING UP your PC's hard drive is like watching paint dry, or sitting next to Aunt Edna at the birthday party. In a word: *boring*.

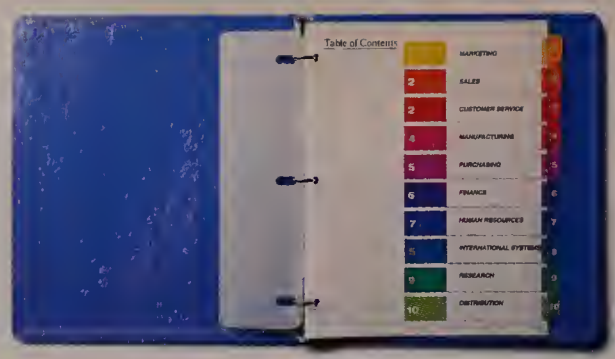
Of course, you can just grit your teeth and hope the house doesn't burn down, the tornado veers away, that brownouts, earthquakes, hurricanes, and floods steer clear of your street. None of those bad things are going to happen to you, right?

Actually, they might. For example: More than 300,000 insurance claims for lightning strikes are filed annually. Guess which electronic device in your home is the most attractive to the average lightning bolt out for a good time?

Okay, forget natural disasters. Think about things like hard disk failures, software conflicts, viruses, and plain old computing goofs. All of these things can make your precious data die an agonizing death.

That's why backups are your last, best hope. When disaster strikes, you'll be able to restore the data and keep on trucking. With most new hard disks pushing 1GB in capacity, though, you don't want to spend your quality time shuffling hundreds of 1.44MB floppies around. You need a separate backup device that makes the process easy.

Fortunately, you have lots of options. The best solution varies depending on whether you're a one-person operation, you split your time between multiple PCs, or you manage a small but thriving bunch of users. Here are the best strategies for each of these scenarios. ▶



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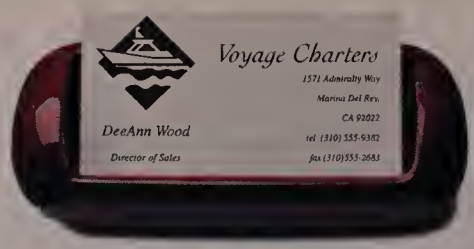

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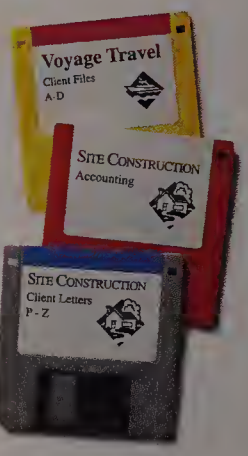

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The best solution is a tape backup drive, which uses cassette-size magnetic tape cartridges. Why? Mostly because they're cheap and getting cheaper every day. For instance, a TR-1 Travan tape cartridge can store about 800MB of data; drives sell for $120 to $260. Travan is a general term used for four classes of tape drives (TR-1, TR-3, and so on) of varying size and storage capacity; the cartridges cost about $30 to $40 each.

Tape drives are also the easiest backup devices to use. Most drives ship with software that lets you perform a full backup of the entire hard disk, selective backups of particular files or directories, or incremental backups, which copy only files that have changed since the last time you backed up. Most software also lets you schedule automatic backup sessions, or works in the background so you can do other tasks on your PC.

Just make sure to buy a drive that lets you fit your hard disk's entire contents on a single cartridge, so you don't have to hang around and switch tapes. Older PCs with less than 800MB of storage can make do with a TR-1 drive, such as the HP Colorado Memory Systems T1000e, but if your hard disk is 1GB or larger, consider a TR-3 drive, like HP Colorado Memory Systems' T3000. The T3000 costs $227 and offers 3.2GB of compressed backup storage. Even better, its relatively fast data transfer rate of 19MB per minute will back up 1GB in under an hour. Godzilla-size hard disks may need a TR-4 tape drive, such as the HP Colorado Memory Systems T4000s ($456), which stores up to 8GB of compressed data.

The downside? Tape isn't the most reliable media. It can be wound too tightly, stretched out of shape, demagnetized, ruined by heat, or fail due to a misaligned read/write head on the drive. (See "The 11 Commandments of Backup" for tips on how to avoid such problems.)

An old technique is to install a second hard disk, then copy the contents of your C: drive to it. This scheme has the advantage of being both cheap and fast. You can find an 850MB drive for about ▶

TALES OF BACKUP HORROR

Up in Smoke

IT TOOK A WHILE, but Deborah and her husband Tom of Phoenix finally computerized all the paper around the house—everything from stock records to bank statements to software serial numbers.

Then their house burned down. And their computer with it. And their stock records and bank statements and everything else. Fortunately, Tom was on the road at the time and had some of the information on his portable computer. Unfortunately, someone at an airport claimed his portable before he could.

Naturally, their computer contained the only records of all their belongings; they hadn't even saved software serial numbers so that they could get replacement copies for free.

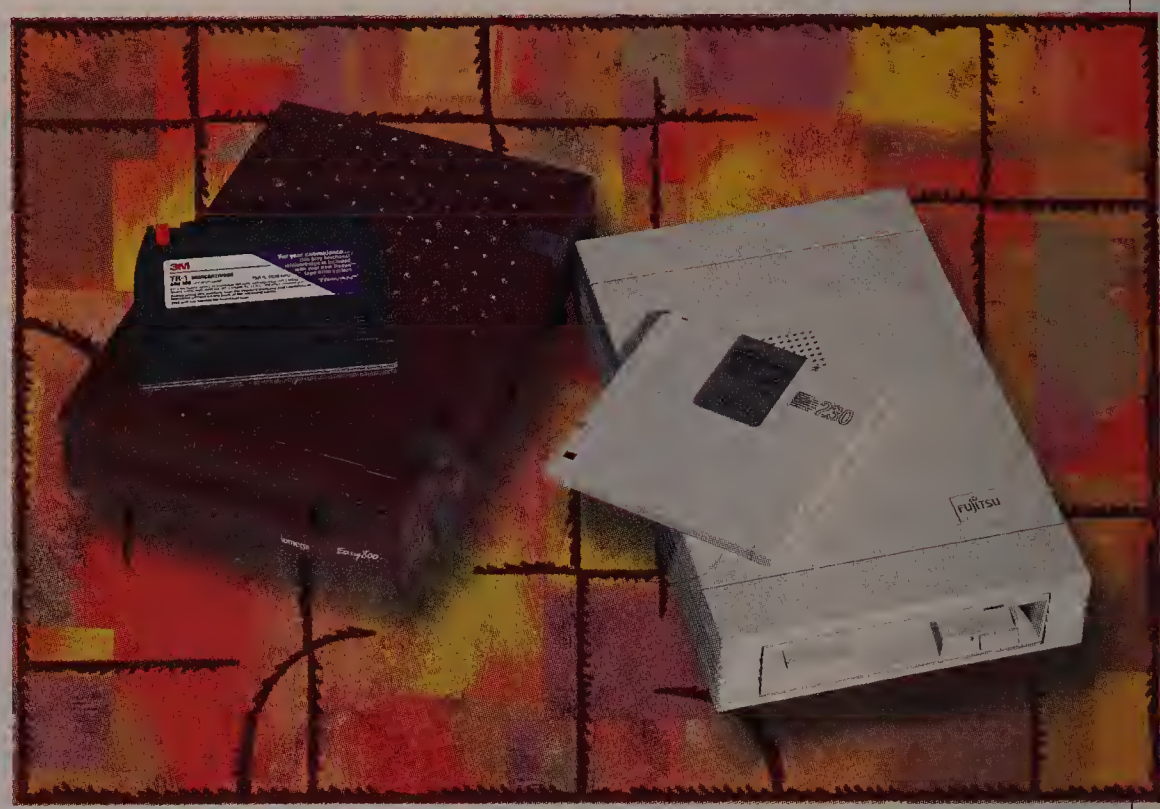
MORAL: Always back up your data—and keep the backup copy in a disaster-proof storage area.

PHOTO, ABOVE RIGHT: BRUCE RACINE

MAGNETIC CHARM: For self-employed users with older PCs, magnetic tape backup drives such as HP Colorado Memory Systems' T1000e, with its 800MB capacity (left), are cheap. Another solution: OR Technology's a:drive (right), which stores 120MB on one floppy.

$185 or a 2.1GB drive for $299. The bad news? You have to remember to do it. And if your PC gets washed away in a flood or perishes in a fire, your backup goes with it.

Some folks may prefer a backup medium that fits in their shirt pocket: Removable cartridge drives like Iomega's Zip or high-capacity floppy drives like OR Technology's a:drive can hold 100MB and 120MB of data, respectively. These $200 devices are handy for doing quick backups of your data files and maybe your Windows directory. And because these drives are designed for everyday storage needs, they offer much faster access speed than tape. But with the cartridges running around $20 a pop, they're not an economical or convenient way to back up a big hard disk.



ON THE GO: Iomega's Ditto Easy 3200 portable tape drive (left) is ideal for backing up on the road. Fujitsu's DynaMO 230 (right) is great for travelers too, and the media lasts longer.

THE FREQUENT FILER

MAYBE YOUR SMALL office isn't so simple. You might shuttle between several PCs—such as the computer at the office, the one in your den, and the portable PC you take on the road. You might want to keep critical data archived for a long time, or have other high-capacity storage requirements. All of these needs add a few more wrinkles to the backup raisin. But not to worry—there's usually a solution that will fit your situation.

Probably your best option for keeping desktops and laptops backed up is a portable tape drive, such as Iomega's Ditto Easy 3200. With the Ditto, you can store data from your office or home system, then take the drive along to back up your data on the road. The $299 Ditto stores up to 3.2GB on each cartridge and connects to any PC via the parallel port (with a pass-through port for your printer). But with a transfer rate of 10MB per minute, the Ditto is about half as fast as a standard tape drive.

A less expensive but slightly risky way to back up a notebook PC is to copy files from it to your desktop system, then ▶

The 11 Commandments of Backup

NEXT TIME a runaway thunderbolt comes to call, will it blast your hard disk's contents into oblivion? Not a chance—if you follow these basic procedures for backing up your data.

1 Back up at regularly scheduled intervals. In a perfect world, you'd do a full backup of all hard disks every week and incremental backups of changed files every day.

2 If possible, use a different tape for each day of the work week; back up every Monday to your tape labeled Monday, for instance.

3 Keep at least one full backup of your hard disk offsite, preferably in a fire-secure area. Or consider hiring a company such as Surefind, which lets you back up your drives over telephone lines.

4 For full backups, select a medium that's large enough to hold the entire contents of your hard disk. This way you won't be tied to your PC, waiting to put in a new tape when one becomes full.

5 Run an up-to-date virus program prior to every backup to avoid preserving corrupted data.

6 Label your backup media with the computer's name and backup date in pen—not (magnetic) pencil.

7 Store tapes and floppies in cases or caddies and keep them safely away from magnetic fields that can corrupt them, such as power supplies, telephones, and monitors.

8 To see if your backup succeeded, randomly select a few files from the front, middle, and back of a backup set and restore them to your hard drive.

9 Make sure that your backup media is device independent—that the data can be restored to a PC other than that from which it was taken.

10 Clean tape drive heads after about 20 uses. Retension your tapes periodically.

11 Pray to the Backup Gods that all of these actions will sufficiently appease them.

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just back up your desktop. Traveling Software's $139.95 LapLink for Windows makes it a snap to shuffle files from one PC to another using a serial cable.

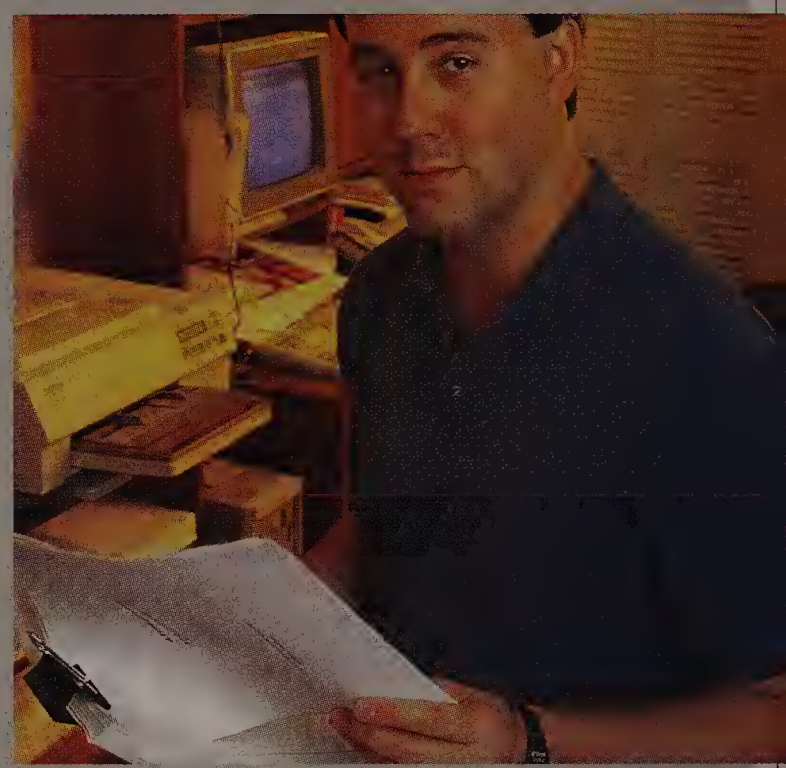
If you have supercritical data, such as a client's accounting records, you may want a more permanent storage option. Your best bet here is a magneto-optical drive, such as Fujitsu's 3.5-inch-format DynaMO 230. With the ability to safely preserve data for 30 years, MO discs are among the most durable storage media around. But a 3.5-inch MO disc holds, at most, only 460MB of compressed data. And at $400 to $500 per, MO drives are the caviar of backup devices.

If you want a device that does double-duty as a backup drive and quad-speed CD-ROM player, check out Panasonic's PD-CD-ROM drive. The external LF-1000AB ($650) lets you write up to 650MB of data on a removable PD cartridge, as well as play standard CD-ROMs. Blank cartridges cost about $50 each—about 7.5 cents per megabyte—and the media is highly durable. But the drives are hard to find, and transfer rates are considerably slower than they are for other backup technologies.

In this wired age, it's now possible to back up your system with nothing but a telephone line and a modem. Surefind's backup service dials up your computer at scheduled intervals, backs up your data, and stores it in a climate-controlled vault. Backing up over normal phone lines is tedious, however, and it can also be a little pricey. Prices start at $9.95 a month for 5MB of data backup each week.

TALES OF BACKUP HORROR

Talk About Writer's Block...



AFTER SENDING his first novel to a publisher, Jim, a computer programmer and aspiring writer in Durham, North Carolina, received notice six months later that they were interested. But his manuscript had been lost; would he please send a duplicate ASAP?

No problem, Jim thought, elated. But when he went to his PC, it wouldn't boot. As it turned out, a read/write head had destroyed the portion of the hard disk where his novel was stored.

Again, no problem; Jim had backed up his work to tape. But after installing a new hard disk and trying to restore his data, Jim found that a misaligned tape head had rendered months of backups useless.

Undeterred, Jim built another PC from some old parts and installed the partially damaged disk. He then began to piece the disk's data together sector by sector, and to rewrite portions of his work from an old draft. Finally, he was ready to send his novel to the publisher.

Unfortunately, the day Jim was to mail the manuscript, he got a letter from the publisher saying they were no longer interested. On the bright side, Jim now has two copies of his novel on tape and six copies on floppy disk—two in each of three different locations.

MORAL: Always verify that your data is safely backed up.

THANKS FOR SHARING: TR-4 tape drives such as HP Colorado Memory Systems' T4000s (left) are best for backing up small offices over a network. Or go the sneakernet route by passing around an Iomega Jaz drive (center) or Exabyte's Eagle TR-3 tape drive (right).

THE ENTREPRENEUR

EVEN BILL GATES had to start somewhere. Running a small enterprise means protecting not only your own data, but the data of the people who work for you. If you don't have a single backup strategy for everyone, you could end up in a world of hurt.

If you're not networked, and money is no object, you could give everyone their own tape drive and have them back up their own disks. But you'd need to enforce this; left on their own, most ▶

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Circle 233 on reader service card

TALES OF BACKUP HORROR

Honey, I Shrunk Your Data

AFTER WEEKS OF WRITING a 700-page medical text, Candace of Nederland, Colorado, was ready for a little R and R. Her plan: a romantic candlelight dinner with her husband Mark. Left with a little time on his hands while Candace prepared dinner, Mark decided to compress the family's hard drive.

Unfortunately, Candace had not backed up her work for three days, and Mark forgot to disengage the computer's virus-detecting software. The pair watched in horror as their computer screen went haywire and her 700-page opus bit the big one.

That night, Candace ate dinner and went to bed alone. Mark spent the evening and much of the next day cuddled up on the telephone with a hardware support technician.

MORAL: Never perform surgery on your PC without a fresh backup—especially when your spouse's data is on the line.

people will back up their data as often as they change the oil in their cars.

If money *is* an object, consider the convenient, affordable Eagle Nest, a $69 dock from Exabyte that installs into a computer's 5.25-inch bay. You can plug the removable, cordless Eagle TR-3 drive ($249) into the dock, back up your data, and then pass the drive along to a coworker.

Another option: Circulate a cartridge hard drive such as Iomega's Jaz drive around the office. Unlike portable tape drives, the $500 external Jaz is nearly as fast as a typical hard drive, and its cartridge is sturdier than tape. But you'll need to appoint someone to handle the task of circulating the drive and labeling and archiving the backup cartridges.

Of course, more and more small offices are installing local area networks. The details of backing up your LAN are best left to your network administrator. If *you're* the LAN administrator, here are some things to keep in mind.

Whether your LAN is server-based, where all PCs are connected to a single system, or peer-to-peer, with users sharing data and apps stored on each other's PCs, you need a good backup strategy.

A TR-4 tape drive like the HP Colorado Memory Systems T4000s provides more than enough space for most small-office networks. One TR-4 tape can hold up to 8GB of compressed data—enough for a small server PC and a handful of workstations attached to it.

Even better, the HP Colorado Backup software, which works with server-based or peer-to-peer LANs, will go out and back up every user's hard disk automatically. The software can also operate in the background, letting you monitor the progress of incremental backups during working hours—just to make sure.

THE BOTTOM LINE

WHICHEVER STRATEGY you choose, remember that shoe company slogan: *Just do it.* So what if backing up isn't exactly a day at the ballpark? It's good for you—like adding fiber to your diet, or flossing after meals. And you'll have a greater sense of security about your most valuable asset: your data.

Mike Hogan is a former PC World *senior editor and frequent contributor.* ▶

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http://www.iomega.com/
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DynaMO 230
Fujitsu 800/626-4686
http://www.fujitsu.com/
Street price: $399
READER SERVICE NO. 745

Eagle Nest, Eagle TR-3
Exabyte 800/392-2983
http://www.exabyte.com/
List price: Eagle Nest $69, Eagle TR-3 $249
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HP Colorado Memory Systems T1000e, T3000, T4000s
Hewlett-Packard
800/810-0133
http://www.hewlett-packard.com/
List price: T1000e $225 to $255 (external), T3000 $227 (internal), T4000s $456 (internal)
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LapLink for Windows
Traveling Software
800/343-8080
http://www.travsoft.com/
List price: $139.95
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LF-1000AB
Panasonic
800/742-8086
http://www.panasonic.com/
List price: $649.95
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Surefind online backup
Surefind 800/787-0009
http://www.surefind.com/
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For more information about all products in this article, circle reader service no. 912.

PHOTO, ABOVE LEFT: RAY NG

Only one database makes life easier without trashing it first.

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–PC Computing, 4/96

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Hot PICKS for the HOME Office

These are a few of our favorite things.

BY STEVE BASS

TAKE A BYTE OUTTA CRIME

LAST MONTH a friend's company was burglarized and a dozen computers were taken. Needless to say, a nightmare of data loss, downtime, and insurance hassles ensued. Instead of worrying about this happening to you, consider fastening your system to the desk with an AnchorGrip security device. This easy-to-install gizmo consists of a plate and an entrapment device. The plate is attached to the desktop surface using an adhesive mat. The computer slides into the entrapment case, which then attaches to the plate. Two pick-resistant locks hold everything together, making it nearly impossible to remove the computer. (Yes, with the keys, *you* can easily remove the computer from the case for cleaning or repair.) The one nitpick: Removing the adhesive mat from the desk without damaging its surface is an arduous process. AnchorGrip Entrapment System $129.95 list; AnchorPad Products; 800/626-2467, 714/427-1290; anchor@anchor.com.

READER SERVICE NO. 739

THE ANCHORGRIP'S steel cage makes a theftproof home for your desktop PC.

A LITTLE LIGHT goes a long way. ASF Associates' Ultimate Palmtop Light makes it easier to read those tiny LCD screens.

AN ALMOST FREE LUNCH

IMAGINE THIS: A free, virtually unlimited e-mail service that's easy to install and effortless to use. And did I say free? That's right—no start-up or monthly fees. Just call Juno and they'll provide the software (Windows 3.*x* or 95 compatible) and a phone number for accessing messages. In minutes you'll have the ability to send and receive messages across the Internet—all free! Okay, here's the catch: On one corner of Juno's screen, you'll see banner advertising that changes regularly. Don't worry, the ads aren't inside the e-mail, and they don't interfere with sending messages. Other downsides: Juno's unable to attach files, and it ties up your PC, forcing you to stare at the ads while messages are transmitted. But did I mention it's free? Juno; Juno Online Services; 800/654-5866, 212/478-0800; info@juno.com.

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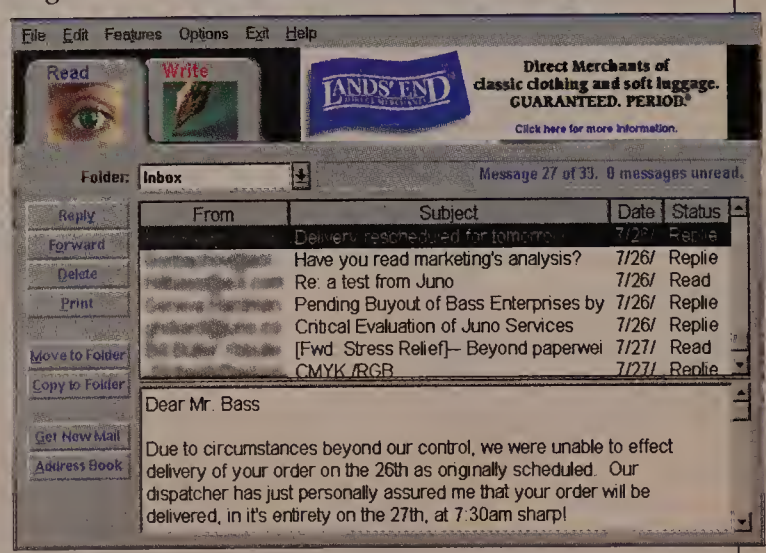

FREE E-MAIL? SURE! Juno's e-mail accounts won't cost you a dime—provided you're willing to look at online ads.

LET THERE BE LIGHT

NEED TO SHED SOME LIGHT on your notebook or palmtop? Check out the Ultimate Notebook Computer Light for cool, hands-free illumination. It comes with NiCd rechargeable batteries, extra bulbs, a slim AC adapter, and a travel case. It's small enough even for those who travel light. Ultimate Palmtop Computer Light Model 300 $29.95 list, Ultimate Notebook Computer Light Model 480 $49.95 list; ASF Associates; 800/936-3638; http://world.std.com/~asfi.

READER SERVICE NO. 741

IT KEEPS GOING AND GOING...

OLD BATTERIES needn't die—they can be rebuilt or replaced. 1-800-Batteries offers over 6000 different batteries for notebooks, camcorders, and cell phones. They can take your old DieHard, rebuild it in ten days, and guarantee it for a year. If your battery is no longer being made, they can build a replacement. 1-800-Batteries prices vary; 800/228-8374; http://www.powerexpress.com.

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Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. See page 14 for contact information.

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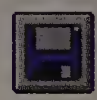
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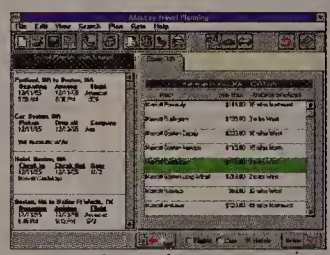
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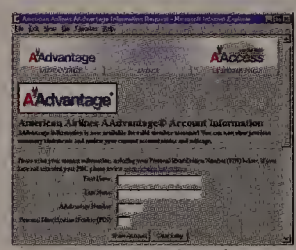
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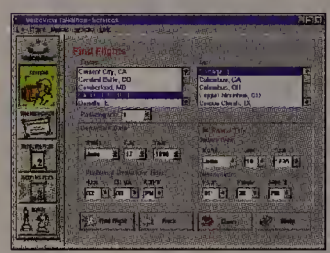
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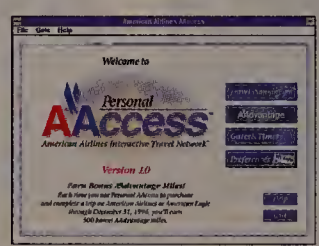

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Home Building Tricks, Web Tools for Kids

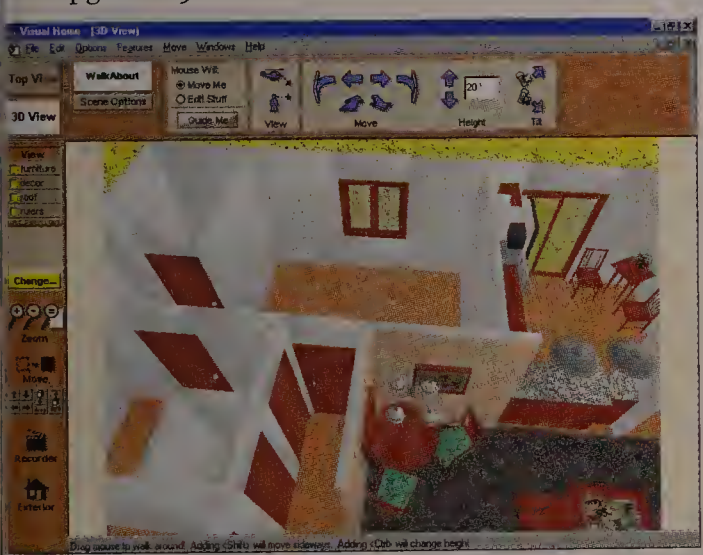
FOUR WALLS, TWO CDs

BUILDING OR RENOVATING a home is never as easy as Martha Stewart says. And using a computer program such as Broderbund Software's **3D Home Architect Edition 2** or Books That Work's **Visual Home** won't make the chore any easier—though it might make the planning process a bit more entertaining.

Of the two programs, Broderbund's upgraded 3D Home Architect is the more complete. You get a generous sampling of design tools, furniture symbols and colors, sample plans for single- and multiple-story homes, viewing options, how-to videos, and spreadsheets for calculating material costs. 3D Home is also easier to use: Once you get the hang of them, drawing lines and placing objects are a cinch.

Visual Home, by comparison, offers a broad palette of colors and designs for fabrics, floors, and walls, but the furniture selection is disappointingly limited. The program also has you building with blocks, adding one room to another—a clunky approach that permits only limited control. And unlike 3D Home, Visual Home doesn't automatically alert you when you place objects incorrectly, such as a couch on top of a coffee table. But at least you won't have to decide which books to display on the coffee table.

—*Leslie Crawford*



VISUAL HOME gives you a bird's eye view of your virtual home, but it limits your selection of furnishings.

3D Home Architect Edition 2

GRADE: **A-**; PRICE: $69.95 list; Broderbund Software; 800/521-6263; http://www.broderbund.com

READER SERVICE NO. 731

Visual Home

GRADE: **B-**; PRICE: $54.95 list; Books That Work; 800/242-4546; http://www.btw.com

READER SERVICE NO. 732

THE REAL DEAL?

JOHN RIPKA is a potential client, a skilled negotiator—and one tough cookie. In **The Negotiator**, an interactive role-playing CD-ROM, your job as Director of Sales is to successfully negotiate the sale of Two Way Interactive Television decoders (TWITs) to Ripka's company. You have 45 minutes to make your pitch. The program teaches you negotiation strategies, problem solving skills, and how to set objectives; then it matches you up against Ripka in a virtual dialog. The session ends with a step-by-step evaluation and suggestions for improving your performance. Salespeople uncomfortable in negotiating situations could learn a few things from this program, but unfortunately the cheesy animation, lack of audio, and Ripka's sometimes-generic responses make this disc a hard sell.

—*Aoife McEvoy*

The Negotiator

GRADE: **C-**; PRICE: $49.95 list; McGraw-Hill; 800/722-4726; http://mcgraw.infor.com:5000

READER SERVICE NO. 733

Get the Picture

GOOD NEWS, shutterbugs: Here's an easy-to-use digital camera that captures video and still images and costs only $269. StarDot Technologies' **WinCam.One** lets you turn your computer display into a black-and-white surveillance monitor. Though the videos tend to be pixelated, still images are of surprisingly high quality (640 by 480, 24-bit color). The WinCam.One isn't very mobile, however: To work, it must be connected to your PC's serial port. And to get close-ups, you must use a screwdriver to adjust a small screw on the camera. Still, this is a versatile, affordable camera for home or small business. **—James Oliver Cury**

WinCam.One

GRADE: **B+**; PRICE: $269 list; StarDot Technologies; 888/782-7368; 714/528-9719; http://www.wincam.com

READER SERVICE NO. 734

EYE SPY: The WinCam.One captures still images or video, then displays them on screen.

EDITED BY James A. Martin

CHECK IT OUT, MATE

CHESS IS CONSIDERED a serious game for serious people, and it can be intimidating for beginners. Luckily, there's now **Chessmaster 5000**, an interactive CD-ROM tutorial/game that covers everything from basic chess rules to the Blackmar-Diemer Gambit, Vienna Variation (yes, that's an actual move). For seasoned players, ChessMaster offers advanced tournament-level play and a searchable database containing 27,000 games from past world-class tournaments. You can even play against computer personalities based on former Grand Masters—wanna take on Bobby Fischer? The disc features beautiful graphics and lets you play over a network, too. —*Glenn McDonald*

CHESSMASTER 5000 is sophisticated enough for experts, but also provides helpful advice for rooks—er, rookies.

Chessmaster 5000

GRADE: **A**; PRICE: $44.99 list; Mindscape; 888/808-4311; http://www.mindscape.com

READER SERVICE NO. 735

THE REST OF THE STORY

FUNNY THING, television news: The more news channels and programs going on the air, the more empty sound bites we seem to get. Thank goodness we have Creative Wonders' **ABC NewsLink: The Current Events Resource**, to add substance, context, and depth to current events—without sacrificing timeliness. The CD-ROM's main menu features a globe that displays geographical, sociopolitical, and historical landmarks. You can pinpoint on the globe where human-rights violations, terrorism, and environmental catastrophes have occurred, and then read about them in text windows. For more information, you can access biographies, in-depth narratives, slide shows, a glossary, and an interactive timeline. Best of all, you can update The Current Events Resource's content with daily downloads from ABC's site on America Online—a nice alternative to Dan, Tom, Peter, and the other talking heads. —*J. O. C.*

ABC NewsLinks: The Current Events Resource

GRADE: **A-**; PRICE: $49.95 list; Creative Wonders; 800/543-9778; 415/482-2300; http://www.cwonders.com

READER SERVICE NO. 736

F Y I

WHO SAYS that only testosterone-crazed teenage boys play CD-ROM games? According to a study done in 1996, 72 percent of the consumers playing games on PCs are over 18, and 40 percent of all PC gamers are women.

SOURCE: INTERACTIVE DIGITAL SOFTWARE ASSOCIATION

MOMMY, I WANNA WEB SITE

"ALL THE OTHER kids in school have their own home page! Why can't I?" If you haven't heard that one yet from your children, you will. But take heart: Vividus's **Web Workshop** makes Web page creation and publication so simple that kids as young as seven can do it. The program's uncluttered interface includes extensive background and image libraries; a simple drawing application that lets kids create their own artwork; and tools for recording sound files and linking to other sites, e-mail, or special "kids-only" online areas such as Yahoo's Yahooligans. A word of caution: Once their pages are online, kids can browse wherever they want, so stay close by if you're concerned about your children viewing inappropriate content. —*Anne Kandra*

Web Workshop

GRADE: **B+**; PRICE: $29.95 list; Vividus Corp.; 415/321-2221; http://www.vividus.com

READER SERVICE NO. 737 ■

KEEPING UP

Low-Cost Long Distance

EVER WONDER WHETHER you're paying too much for long-distance calls to Mom? Well, stop wondering and dial up **Call Cost Comparison** (http://www.callcost.com), a simple calculator that lets you compare the cost of long-distance calls made with AT&T, MCI, Sprint, and Telegroup (which sponsors the site). However, you can't enter specific city-to-city calls (only state-to-state or country-to-country), so you'll get only a ballpark estimate of actual costs. Which carrier was the cheapest? We plugged in more than a dozen potential calls, and the answer varied, depending on the destination.

Who Needs a Notebook?

COMPUSERVE SUBSCRIBERS can now pick up their e-mail with a Touch-Tone phone. Using the **CompuServe Communications Card**, CIS members can call an 800 number, enter a secret access code, and then listen to the messages, courtesy of text-to-voice synthesizer technology. The service costs 25 cents per minute for local calls and 50 cents for the first minute of long-distance calls.

Time to Unwind

LOOKING FOR A QUIET hideaway in snow-packed Vermont, or a weekend retreat along the California coast? You can find coast-to-coast charm with **InnFinder** (http://homearts.com/affil/ahi/usgraph.htm), a service of HomeArts and American Historic Inns. Select the state you plan to visit and highlight as many cities as you like. Many listings include sketches of the inns, along with details about rates and amenities like in-room hot tubs. Others include only an address and a phone number. Unfortunately, you still can't make reservations online. Maybe next year.

—Roberta Furger

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Introducing the *Fortune 500®* home office. Otherwise known as the Compaq Presario 6000 Series. You could say it was inspired by one simple yet bold idea: to help you be just as professional at home as you would be in any big business setting. In other words, the Presario 6000 Series is loaded with features that empower you by making you more productive and efficient.

Take our two-line 33.6Kbps modem. Not only does it allow you to perform multiple communications at once—like faxing one client while speaking with another—it provides the fastest Internet access available over standard phone lines.

And since document management is important in any office, our keyboard comes equipped with one rather extraordinary feature: a built-in scanner. So you can scan notes and articles, store receipts, copy faxes—all literally at your fingertips.

And to assist in preparing reports, presentations, spreadsheets and everything in between, the Compaq Presario 6000 Series comes with the latest business software. Like Microsoft Word and Microsoft PowerPoint, Corel Draw 5.0 and Lotus 1-2-3.

The home office will never be the same again. Introducing the Compaq Presario 6000 Series.

We've even put in JBL Pro speakers and MPEG video playback for incredible sound and full-motion video. After all, we had to mix a little pleasure with all the business you'll soon be doing. To learn more, visit us at www.compaq.com or call 1-800-345-1518.

Circle 35 on reader service card

PC WORLD

TOP 5 HOME PCs

	SYSTEM	Street price (9/25/96)	Overall rating	PC WorldBench score	Reliability/ service rating	Setup rating	Comments	Reader service number
1	Dell Dimension P200v 800/613-3355 http://www.us.dell.com	$2299	78	202 outstanding	best/ best	fair	**FEATURES:** P-200, 16MB of RAM, 1.6GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem , 15-inch monitor. **PRO/CON:** Your basic bare-bones muscle machine, with speedy performance at a very reasonable cost. Price here includes Microsoft Office Pro, but no other software. Mail-order only, so best suited for experienced users.	671
2	Compaq Presario 4402 800/345-1518 http://www.compaq.com	$1999	76	153 fair	best/ fair	very good	**FEATURES:** P-133, 16MB of RAM, 1.6GB hard disk, 6X CD-ROM drive, 33.6-kbps fax-modem with voice mail, speakerphone, DSVD; remote control for telephony and cursor, 15-inch monitor. **PRO/CON:** Very easy setup; great price; middle-of-the-road performance. Includes Microsoft Encarta and Quicken. A solid entry-level machine.	672
3	Micron Home MPC 800/438-3343 http://www.micron.com	$2899	76	215 outstanding	best/ best	good	**FEATURES:** P-200, 32MB of RAM, 1.2GB hard disk, 8X CD-ROM drive, 28.8-kbps fax-modem with voice mail, 17-inch monitor. Includes Microsoft Office Pro. **PRO/CON:** True power machine for home or home office. Nice software package, including Quicken, Microsoft Encarta, and MechWarrior 2. On the expensive side.	673
4	Gateway 2000 P5-166 Family PC 800/846-2000 http://www.gw2K.com	$2399	75	199 very good	fair/ good	good	**FEATURES:** P-166, 16MB of RAM, 2.5GB hard disk, 8X CD-ROM drive, 17-inch monitor. **PRO/CON:** Very fast, good price, big hard drive and monitor. Available only through mail order. Gateway 2000's so-so reliability rating and phone-based support make this a system for the confident user.	674
5	Compaq Presario 4712 800/345-1518 http://www.compaq.com	$2698	75	188 good	best/ fair	good	**FEATURES:** P-166, 24MB of RAM, 2.5GB hard disk, 6X CD-ROM drive, 33.6-kbps fax-modem with DSVD, voice mail, and speakerphone, 15-inch monitor. **PRO/CON:** Great home office communications center. DSVD allows for simultaneous voice and data connections. Slightly high price. Limited software package.	675

Best Buy http://www.pcworld.com/top5soho All products: 905

HOW WE TEST The overall rating is based on reliability and service (30 percent), price (20 percent), PC WorldBench performance (20 percent), setup (10 percent), compatibility (10 percent), and extra features (10 percent). Reliability and service ratings are based on results of PC World's Reliability and Service Monitor survey.

TWO NEW SYSTEMS broke into the Top 5 this month, each an excellent value. Going straight to the top of the chart is the Dell Dimension P200v. This bare-bones muscle machine offers outstanding Pentium-200 performance at an affordable $2299. You won't find fancy extras like a 17-inch monitor or a multimedia software package, but the price does include Microsoft Office Pro.

The P200v isn't the easiest machine to set up—it lacks the color-coded cables and ports found on most home systems—and since Dell systems are available only through mail order, you won't find a local sales rep to walk you through the process. But Dell's superb service and system reliability make the P200v an excellent foundation for constructing a home office.

Placing just below the Dell is Compaq's Presario 4402. Priced at a low $1999, the 4402 is a great choice for the first-time computer buyer who wants simplicity, affordability, and Compaq's rock-solid reliability. Its all-in-one design groups the CPU, monitor, and speakers in a single easy-to-set-up unit. But don't expect blinding performance; it has a P-133 processor and comes with no additional cache. It's a good choice for first-timers on a budget.

Rounding out the Top 5 are three holdovers from our November chart. At number three is Micron's Home MPC, the fastest home system we've ever seen. Micron gets our readers' nod for reliable machines and excellent reliability. A price drop from $3049 to $2899 makes the Home MPC even more attractive, if still a little pricey for a home system.

Also returning are the Gateway 2000 P5-166 Family PC and the Compaq Presario 4712. The Family PC offers quick performance and great value, but Gateway 2000's so-so service and reliability ratings make this computer a less-than-ideal choice for the novice. The Presario 4712 is geared for the power user, with 24MB of RAM and a bounty of telephony features.

HP's latest entry, the Pavilion 7285, just missed the Top 5. This speedy Pentium-200 comes with 32MB of RAM and a big 3GB hard drive. Only its weighty $3449 price kept it off our list.

Happy shopping!

—*Kirk Steers*

DELL'S DIMENSION P200V is a great system for a home office.

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulricke Diehlmann of the PC World Test Center.* ■

With TurboTax, *every* tax form is an EZ.

This tax season, put America's #1-selling tax preparation software to work for you! TurboTax® makes completing your federal income tax return as easy as 1, 2, 3!

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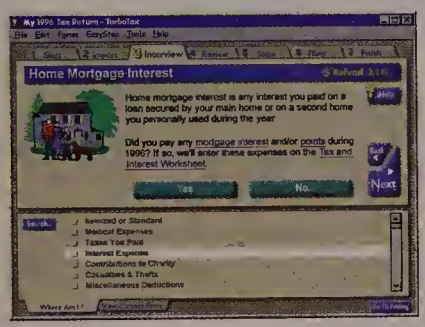
Enjoy the benefits of professional tax help without the expense. Our built-in *Tax Advisor* points out omissions on the fly … and offers helpful hints and suggestions to improve your tax situation. Plus, the *Final Review* checks for errors and overlooked deductions to save you money.



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It's easy to get *even more* money-saving tax advice … with TurboTax Deluxe on CD-ROM. TurboTax Deluxe combines the power of TurboTax with multimedia tax advice:

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Call to order your copy of TurboTax or TurboTax Deluxe today … and see for yourself why TurboTax is America's #1 tax preparation software!

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TripMaker 1996 by RAND McNALLY

The 1996 Edition of TripMaker™ by Rand McNally is the all-in-one solution for planning road trips in the U.S., Canada, and Mexico. It not only gets you from here to there, it also plans entire trips—choose from 88 pre-planned scenic tours! (CD-ROM only.)

TurboTax won every major tax software award in 1996!

March 1996

February 1996

February 1996

April/May 1996

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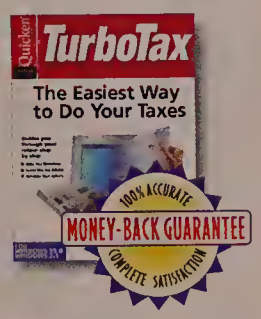

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Contacts, Organization, and Chicken Sandwiches

SCIENCE HAS DISCOVERED the *disorganization* gene, and I'm convinced it's responsible for my messy desk. (My biologist wife says it's part of the Y chromosome.) Since my health insurance doesn't cover rearranging my DNA, I started using a personal information manager to organize my life. I've found one that does all sorts of neat stuff—and I didn't need to invest months to learn how to use it.

Over the years I've tried scores of contact managers and PIMs, searching for one that suited my working style. Most were enormous applications with more features than I could ever use, and took what felt like an eternity to learn.

But then I saw Baseline Data System's Info Accelerator at a user group meeting. I knew this wasn't another ho-hum contact manager. The more I experimented with it, the more unique features I found. And best of all, IA can add itself onto the menu bar of most popular Windows word processors. You can use it as a stand-alone program if you prefer, but you'll miss some very alluring features. IA works with Word for Windows 2.0 and later, as well as with Word Pro 96, the older Ami Pro, and every Windows version of WordPerfect. And yes, IA works just fine in both Windows 3.*x* and Win 95.

INSERT ADDRESS HERE

WHAT EXACTLY DOES it *do* in your word processor? Okay, imagine you have to send a letter to the six CPAs you fired in the past year. One click and Info Accelerator's phone book pops up. Another two clicks and you've got the list of CPAs. A few more clicks and voilà!—the letters have everything, including names, addresses, and salutations, all ready for your golden prose. Another couple of clicks prints matching envelopes or labels. You can do the same thing with faxes and forms. Every bit of data inside IA can be stuck into a word processing document with the ease of selecting a font.

> Not **impressed**, yet? Okay, then check out Info Accelerator's **Chicken Sandwich** Technology (yes, that's the **real** name).

Not impressed, yet? Okay, then check out Info Accelerator's Chicken Sandwich Technology (yes, that's the real name), which sandwiches itself between applications, making sure that any contact information you enter into Quicken, Quickbooks, or TimeSlips also ends up in IA's phone book, where it's available to just about any fax program. The technology grabs new data only as you enter it; it doesn't read what you've already got.

Let's say you begin entering a new client's vital statistics—name, address, phone, and so on—into Quicken. The Chicken takes over, popping Info Accelerator's phone book onto the screen. You enter the data into the phone book and the Chicken ports that information back to the application you were working in. The next day you want to send the same client a fax from your word processor. No problem. All the addressing information is already in IA's phone book, which relays it to your fax program.

Did I mention that Info Accelerator has a calendar? As you'd expect, it supports to-do lists, recurring events, alarms, and multiple views. Between the phone book and calendar, I'm able to keep track of clients and appointments, make phone calls (logging both calls and documents), and print my daily schedule and to-do list.

A COUPLE OF DINGS

BUT I HAVE TO tell you, this program could sure use some help—the context-sensitive kind. It's there, but there's not enough of it, and you can't always get to it from where you are. A couple of wizards would be nice, too.

Also, while some of my phone calls require a phone card prefix, most do not. With Info Accelerator, either all calls use a phone card number or none do.

Don't get me wrong. I'm nit-picking here—these are not issues that would make me stop using the program. Overall, I'm quite satisfied. My desk is clear, I'm feeling more organized, and my genes are telling me to have a chicken salad sandwich for lunch.

Info Accelerator

$100 (street); Baseline Data Systems; 800/429-5325, 310/214-8528, 310/214-8529 (fax); http://www.baselineconnect.com.

READER SERVICE NO. 686

Contributing Editor Steve Bass is a licensed marriage and family therapist, and president of the Pasadena IBM Users Group. He can be reached on PC World Online *(see page 14 for more information).* ■

PC WORLD MULTIMEDIA EDITION

INSIDE

M5 Hardware Reviews
The Aztech Waverider Pro32-3D is the new king of the sound board chart. We also reveal the Top 5 CD-ROM drives.

M11 Q&A
Find answers to your most vexing multimedia questions, plus a Solution of the Month.

EDITED BY
Kimberly Stein

Gifts We'd Love to Get

BY DIANE MEHTA

Here are 15 great gift ideas that the multimedia mavens in your family are bound to love.

HOLIDAY BEST BUYS

WITH THE HOLIDAYS just around the corner, it's time to start those treks to the mall. But hey, who needs another bottle ▶

of cologne? This year you can find high-quality multimedia toys at lower prices than ever before. We spotlight a number of fun multimedia gizmos under $500, ranging from practical to frivolous and sure to delight the PC owners on your shopping list, no matter what their age or experience level.

ART TABLET

WACOM ARTPAD II AND FRACTAL DESIGN DABBLER 2

IF NO COMPUTER MICE are stirring at your house, try an art tablet instead. The 4-by-5-inch ArtPad II, bundled with the latest version of Dabbler, is perfect both for children who want to draw on the computer and for adults who need a tablet for 2-D and 3-D illustration or image editing chores. You get Wacom's new DuoSwitch Erasing UltraPen, which provides all the functions of a three-button mouse—and it's programmable, too. You can trace drawings right on the tablet to quickly get images into your computer, and erase lines easily.

$175 list; Wacom Technology; 800/922-6613; http://www.wacom.com

READER SERVICE NO. 716

CAMERA

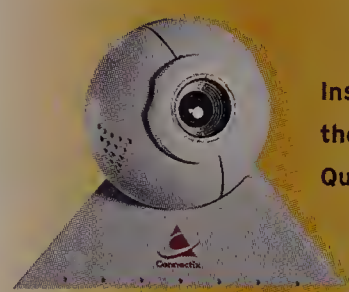
CONNECTIX COLOR QUICKCAM CAMERA

FORGET E-MAIL and voice mail. What you really want is face mail. Like the perennially promised but never quite ready videophone, this digital camera, which has its own videoconferencing software, will add an exciting visual element to your phone conversations. Simply install the software and attach the camera to your computer's parallel port, then dial up a friend who has a similar setup to enjoy live video talk across the wires. The software works on modems, ISDN lines, and local area networks. This arrangement is handy if you telecommute from home or run a small business there. In addition, once you register the product, you'll receive a "movie recorder" application that lets you send video mail electronically.

Camera $229 street, VideoPhone software version 1.1.2 $50 street; Connectix; 800/950-5880; http://www.connectix.com

READER SERVICE NO. 717

Dabble with the ArtPad II and Dabbler.



Instant video: the Color QuickCam.

Say gee: Kodak's DC20 camera.

To go: IBM's external 4X CD-ROM drive.

Blast 'em: the Firebird 2 joystick.

KODAK DIGITAL SCIENCE DC20 COLOR DIGITAL CAMERA

KODAK'S DC20 DIGITAL camera offers a quick and easy way to get snapshots of your New Year's party into your PC. Its automatic exposure and focus-free lens guarantees fun for nonexperts. The 4-ounce, compact camera (1.2 by 4 by 2.4 inches) can easily fit in a jacket pocket. You can adjust the picture for high or low resolutions: 493 by 373 pixels (this gives you 8 pictures maximum) or 320 by 240 (16 pictures). Compatible with both Macintoshes and PCs via a serial cable, the DC20 includes software that lets you drop your pictures into cards or invitations, create slide shows, download pictures to other software programs, and reshape and distort your images.

$299 list; Eastman Kodak Company; 800/235-6325; http://www.kodak.com

READER SERVICE NO. 718

CD-ROM DRIVE

IBM EXTERNAL PCMCIA STEREO 4X CD-ROM DRIVE

LOOKING FOR MULTIMEDIA to go? IBM's snappy black portable drive is perfect for bringing your CD-ROMs on the road. The 2-by-5-by-7-inch unit plugs into a PC Card II slot. It provides built-in 16-bit stereo audio with an FM music synthesizer. The rechargeable NiCad batteries go in a pop-up compartment at the rear. There's a joystick/MIDI port for games, a line output jack to connect it to your stereo, and a handy headphone jack so you can listen to your discs without bothering others.

$490 street; IBM; 800/426-2968; http://www.pc.ibm.com

GAME GEAR

ADVANCED GRAVIS FIREBIRD 2 PROGRAMMABLE JOYSTICK

WITH AN ECCENTRIC-looking, sleek design, the Firebird 2 offers pure firepower at the touch of a button. The T-grip throttle is designed to prevent fatigue so you can play longer and with greater facility. It has 13 buttons, with an eight-way directional thumb-controlled switch to increase mobility, and you can assign 106 keystrokes, including cheat codes, to the buttons. The product is compatible with all PC-

based flight-simulation and action games and runs on Windows 3.1, Windows 95, DOS, and OS/2.

$89.95 list; Advanced Gravis Computer Technology; 800/663-8558; http://www.gravis.com

READER SERVICE NO. 719

NUVISION 3-D SPEK

IMAGINE AIRPLANES FLYING out of your computer and a sky so vivid you feel like you're in Bermuda. NuVision's 3-D stereoscopic glasses—the only ones available for less than $100—let viewers see video and computer graphics in strikingly realistic 3-D. The glasses include drivers for Descent II, Whiplash, and Slipstream 5000, making images look frighteningly lifelike with no irritating flicker. The 3-D glasses are electronically synchronized with your computer via small wires that attach to the serial port, and battery performance is estimated at about 200 hours. Another plus: You can wear the lightweight specs over prescription eyeglasses without discomfort.

$99 list; NuVision Technologies; 800/920-9327; http://www.nuvision3d.com

READER SERVICE NO. 720

MICROSOFT SIDEWINDER GAME PAD

GOT A MULTIPLAYER game addict in your family? Microsoft's new ergonomically designed SideWinder is one of those "to die for" items serious gamers dream about. With shortcuts for easing multibutton moves, as well as an eight-way cross keypad, six action buttons, and two trigger buttons, the SideWinder is no minor desktop battle station. You can daisy-chain up to four SideWinder game pads together, so you can play head-to-head or on a team. The unit includes a game sampler containing miniversions of Gex, Microsoft Marbles, and Time Commando.

$39 list; Microsoft; 800/426-9400; http://www.microsoft.com/hardware/

READER SERVICE NO. 721

THRUSTMASTER WIZZARD PINBALL CONTROLLER

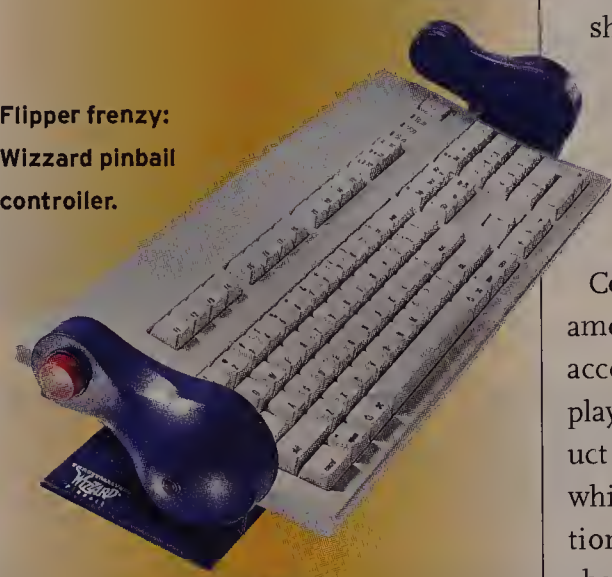
IF YOU'RE A BUDDING pinball wizard, ThrustMaster's Wizzard will make you flip. Instead of using keys to emulate flipper buttons, you simply attach the two purple Wizzard controllers to either side of your keyboard, providing the feel of the authentic arcade game. Dual Stage Flipper buttons give you independent control of a game's upper and lower screen flippers. ThrustMaster includes Maxis's Full Tilt Pinball software, and the unit is compatible with most popular pinball games, such as Virgin Interactive's Hyper 3D and Amtex's Royal Flush.

$39.95 list; ThrustMaster; 503/615-3200; http://www.thrustmaster.com

READER SERVICE NO. 722

Gaming peepers: 3-D Spek.

The SideWinder's a gamer's dream.



Flipper frenzy: Wizzard pinball controller.

AirMedia Live delivers news.

What's on tonight? WebTV clues you in.

INTERNET SOFTWARE

AIRMEDIA LIVE

NEWS JUNKIES ON your list will love AirMedia Live. This wireless, pyramid-shaped receiver and software package brings the news straight to your PC screen. A blinking light alerts you to breaking financial, political, and sports news. The AirMedia Broadcast Network features content from CompuServe and Reuters New Media, among others. The software filters items according to your preferences and displays headlines and abstracts. The product includes the Power Up service plan, which delivers general-interest information free for one year, after which it's about $3 per month. A Premiere Service is free for 90 days and costs $5.95 per month thereafter.

$150 list; AirMedia Live; 800/247-6334; http://www.airmedia.com

READER SERVICE NO. 723

INTERNET TV

PHILIPS MAGNAVOX WEBTV

NOW YOU CAN AFFORDABLY access the Internet on television, in the comfort of your own living room—and all you need is a TV, a phone line, and Philips' Magnavox WebTV. The $329 Internet box comes with a remote control and wireless, infrared keyboard. WebTV's own online service costs $19.95 a month. Simply connect the box to your TV and a phone line, then push a button on the remote control. WebTV lets you send and receive e-mail with audio or surf the World Wide Web while you wait for *The X Files* to come on.

$329 list; Philips Consumer Electronics; 800/597-1790; http://www.magnavox.com

READER SERVICE NO. 724

Wow! A Free Set of Yamaha Headphones!

Retail Value Up To $29.95. With Purchase of M15, System 35 or System 45 Only. Limited Time Mail-in Offer Ends 1/31/97.

You've got a CD-ROM drive, a wavetable sound card and you've got computer speakers with the power and fidelity of a 1963 transistor radio.

You've got to get Yamaha YST™ Multimedia Speakers.

It doesn't matter if you're conquering virtual alien hordes or calming your nerves with a Vivaldi CD while balancing the check book.

Yamaha YST multimedia speakers release the stunning audio performance that's already right there in your computer.

Try playing an audio CD in your CD ROM drive to hear how your speakers really stack up. If you had Yamaha YST speakers you'd hear smooth, crisp, clean sound. And you'd have plenty of power—with ratings from 5 watts per speaker to 45 watts of total amplifier power.

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And if you look at the bottom of this page, you'll find a computer retailer who's got Yamaha multimedia speakers. You've got to go get them.

YAMAHA®
THE WAY YOUR COMPUTER SHOULD SOUND.

YST-M7 Multimedia Speakers

YST-MSW10 Sub-woofer

System 45 Multimedia Speakers

Yamaha multimedia speakers MSRP from $69.95 - $249.95 at these fine retailers.

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Circle 258 on reader service card

KEYBOARD

FATAR STUDIO 490/PLUS

YOU SAY YOUR PAD'S too small for a Steinway baby grand? Then check out Fatar's 490/Plus MIDI controller, which gives you the sensation of playing a real piano. Its full-size, velocity-sensitive keys provide a range of movement and expressiveness when playing, while its sustain and volume pedals offer still more control. The software lets you switch to any of 16 MIDI channels easily. Its two parallel MIDI jacks let you control as many as eight MIDI instruments.

$299.95 list; Fatar Studios; 800/431-6699; http://www.musicindustries.com

READER SERVICE NO. 725

SPEAKERS

CAMBRIDGE SOUNDWORKS

MAKE A NEW YEAR'S resolution to put up no longer with tinny sound from your PC. The SoundWorks amplified subwoofer and satellite speakers produce deep, resonant audio for listening to your favorite holiday tunes. It also has a 12-volt input so you can plug it into the cigarette lighter in a car or boat. The cube satellites come in black, and they have stands and Velcro attachments, so you can hang them on the sides of your computer. The volume control is a switch on a cable, not on the speaker.

$219 list; Cambridge SoundWorks; 800/367-4434; http://www.hifi.com

READER SERVICE NO. 726

Realistic MIDI: Fatar's keyboard.

Big sound: SoundWorks.

STORAGE

IOMEGA JAZ DRIVE

HERE'S SOMETHING for the computer user who has everything except hard disk space. Iomega's Jaz drive, which holds 1GB cartridges, gives you storage galore. It's useful for everything from backing up your hard drive to sharing graphics, clip art, video, and multimedia applications with others, and the drive works with Macs or PCs with SCSI connec- ▶

PC WORLD

TOP 5 CD-ROM DRIVES

	CD-ROM DRIVES	Month tested	Street price (9/26/96)	Overall rating	Multimedia performance score	Comments	Reader service number
1	Sony CSD-880E 800/352-7669 http://www.sony.com/technology	Sept 96	$140	90	79	**FEATURES:** 8X internal drive, Enhanced IDE, tray-feed mechanism with clips for side-mounted use; includes adapter card. **PRO/CON:** Good overall performance, reasonable price, generous daily and weekend support, generous 256K buffer; no bundled software, no toll-free support.	706
2	Plextor 8PleX PX-83CS 800/886-3935 http://www.plextor.com	Aug 96	$309	90	90	**FEATURES:** 8X internal drive; SCSI bus; caddy-feed mechanism; driver support for Windows 3.x, 95, and NT, and OS/2 and Mac. **PRO/CON:** Fastest drive tested, two-year warranty, solid design; expensive, SCSI card not included, no weekend support.	707
3	Teac CD-58E 8X CD-ROM Drive Kit 213/726-0303	Aug 96	$149	89	84	**FEATURES:** NT drivers added, 8X internal drive, Enhanced IDE, tray-feed mechanism with clips for side-mounted use. **PRO/CON:** Strong performer, reasonably priced; no software bundle, limited 128K buffer, no Mac or OS/2 drivers, no weekend support, no toll-free support.	708
4	NEC MultiSpin 6V 800/632-4636 http://www.nec.com	Aug 96	$99	87	65	**FEATURES:** 6X internal drive, Enhanced IDE, tray-feed mechanism with clips for side-mounted operation, includes adapter card and cables for Sound Blaster card. **PRO/CON:** Inexpensive, toll-free phone support; slowest performance in Top 5, no software bundle, no weekend support.	709
5	GoldStar GCD-R580B 800/243-0000 http://www.goldstar.com	Aug 96	$160	87	77	**FEATURES:** 8X internal drive; Enhanced IDE; tray-feed mechanism with clips for side-mounted operation; driver support for Windows 3.1, 95, and NT, and OS/2. **PRO/CON:** Inexpensive, 11-hour weekday toll-free support, generous 256K buffer; no weekend support, no software bundle.	710
	Best Buy					All products:	909

THE CADRE OF TOP CD-ROM DRIVES remains unchanged from November's line-up. This month we ran Micro Solutions' external Backpack 8X CD-ROM Drive With Sound through its paces. The Backpack 8X didn't fare well in our tests; in some benchmarks it ran half as fast as the top contender, Sony's 8X CSD-880E. Its steep $450 price—more expensive than any CD-ROM drive we've reviewed—also kept it out of the Top 5. The Backpack 8X features built-in audio and can play on its side if you need to conserve desktop real estate.

HOW WE TEST All drives are tested on a Gateway 2000 P5-166XL with 16MB of RAM and Windows 95. At 1024 by 768 resolution at 256 colors, we run Macromedia Director 5.0 I/O benchmark, Microsoft Encarta 96 script, PowerFinder PhoneDisc 96 timed name search, and MindScape CyberSpeed game installation. We also run a 98-image slide show in Corel PhotoLab and run the CD-Tach low-level CD-ROM benchmark utility. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

tors. If 1GB isn't enough, you can buy extra cartridges for about $125 each.

$499 list (external), $399 list (internal); Iomega; 800/697-8833; http://www.iomega.com

READER SERVICE NO. 728

Store it: the Jaz Drive.

VIDEO

ALARIS QUICKVIDEO

FIRST SINGING TELEGRAMS, and now videograms. The QuickVideo package includes an ISA-based video capture card that lets you grab color images from any source, including television sets and camcorders. You can then save the images as AVI files or self-playing videograms that you can send to friends for playback on their PCs. Remarkably, the videogram is so tightly compressed that you can send a 60-second video on only one floppy disk—a pretty unusual feat for today's megabyte-devouring video files. Alternatively, you can send a holiday video message through the World Wide Web or as an e-mail attachment. All that your Web page visitors need to do is double-click your videogram to download it.

$299 list; Alaris; 800/317-2348; http://www.alaris.com

READER SERVICE NO. 729

Color in a hurry: Alaris QuickVideo.

SONY SLV-960HF VCR WITH VIDEO DIRECTOR HOME

IN THIS NEW VCR/software tool, Sony bundles its new Flying Erase Head Hi-Fi Stereo VHS VCR with an edition of Video Director Home, Gold Disk's editing program. The software lets you quickly create movies with music or narration: Use the camcorder as the source and the VCR as the record deck, and edit on your PC. A cable conveys the video into your PC.

You can choose favorite scenes from various tapes, rearrange them, and assemble a fully edited tape.

$479 street; Sony Electronics; 800/222-7669; http://www.sony.com

READER SERVICE NO. 730

Sony's VCR has editing software.

Diane Mehta is an associate editor for PC World. ■

PC WORLD

TOP 5 SOUND BOARDS

	SOUND BOARDS	Month tested	Street price (9/26/96)	Overall rating	Audio score	Comments	Reader service
1	Aztech Waverider Pro32-3D PnP 800/886-8859 http://www.aztechCA.com	new	$75	99	68	**FEATURES:** MIDI wavetable sound; Plug and Play; IDE interface. **PRO/CON:** Bargain price, very good MIDI wavetable, trouble-free installation, effective 3-D sound; poor microphone recording, low line input overload level, no reverb or chorus.	711
2	CrystaLake Model 110 503/222-2603 http://www.crystalake.com	Aug 96	$129	97	87	**FEATURES:** Plug and Play; 3-D sound with adjustable center, fill, and effect depth; stereo microphone input. **PRO/CON:** High-quality wavetable MIDI audio, realistic 3-D sound effects, good frequency response, inexpensive, three-year warranty; poor cross-talk figures, no reverb or chorus.	712
3	CrystaLake Model 140 503/222-2603 http://www.crystalake.com	June 96	$199	95	87	**FEATURES:** $30 price drop; Plug and Play; 3-D sound with adjustable center, fill, and effect depth; reverb and chorus; stereo microphone input. **PRO/CON:** High-quality wavetable MIDI sound, realistic 3-D sound effects, low noise, good frequency response, three-year warranty; poor cross-talk figures.	713
4	Creative Labs Sound Blaster AWE32 PnP 800/998-1000 http://www.creativelabs.com	June 96	$250	91	92	**FEATURES:** Plug and Play, 512K of RAM expandable to 28MB for downloadable MIDI sounds, DSP for MIDI effects, Sound Font editing software. **PRO/CON:** Top-quality wavetable sound, flexible MIDI composition software, easy installation; poor frequency response on microphone input, no toll-free support.	714
5	Creative Labs Sound Blaster 32 800/998-1000 http://www.creativelabs.com	June 96	$149	90	90	**FEATURES:** Plug and Play, 512K of RAM expandable to 8MB. **PRO/CON:** Excellent audio performance, good microphone input, professional-grade wave editing and MIDI software, affordable, easy installation; mediocre MIDI sound, poor frequency response on microphone input, no toll-free support.	715

Best Buy — All products: 910

THE BARGAIN-PRICE Aztech Waverider Pro32-3D PnP pushes the long-dominant Sound Blaster AWE32 PnP from its top spot this month. The Waverider features a $75 street price, solid wavetable MIDI, and 3-D sound. The two CrystaLake units cut their prices, which moved them up the chart. This month we also tested the dirt cheap ($52) TeleVideo TeleSound EX16-3D, which provides impressive 3-D sound but has only a basic FM synthesizer. Wavetable audio costs just a few dollars more than FM and offers vastly superior sound.

HOW WE TEST All boards are tested on an Audio System Precision System Two audio test set to determine their frequency response, cross talk, noise, distortion levels, and other audio characteristics. We judge MIDI and wave audio quality by comparing sample sounds against original source material on DAT. The overall rating is based on the following weighting of factors: performance (40 percent), features (25 percent), price (25 percent), and support policies (10 percent). For all ratings, higher is better. Data based on tests designed and conducted by Liberman Sound. All rights reserved.

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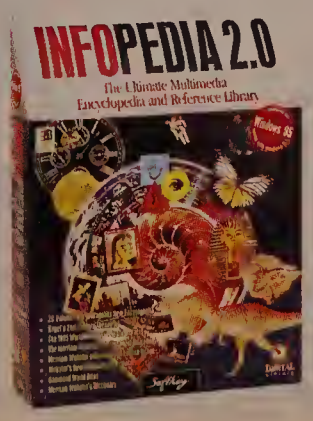

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Circle 130 on reader service card

TECHNOLOGY UPDATE

How to make your car invisible to radar and laser...*legally!*

Rocky Mountain Radar introduces a device guaranteed to make your car electronically "invisible" to speed traps—if you get a ticket while using the product, the manufacturer will pay your fine!

■ *The Phazer will "jam" both radar and laser guns, preventing police from measuring your speed.*

If your heart doesn't skip a beat when you drive past a speed trap—even if you aren't speeding—don't bother reading this. I can't tell you how many times that has happened to me. Driving down the interstate with my cruise control set at eight miles over the limit, I catch a glimpse of a police car parked on the side of the road. My heart skips a beat and for some reason I look at my speedometer. After I've passed the trap, my eyes stay glued to my rear view mirror, praying the officer will pass me up for a "bigger fish."

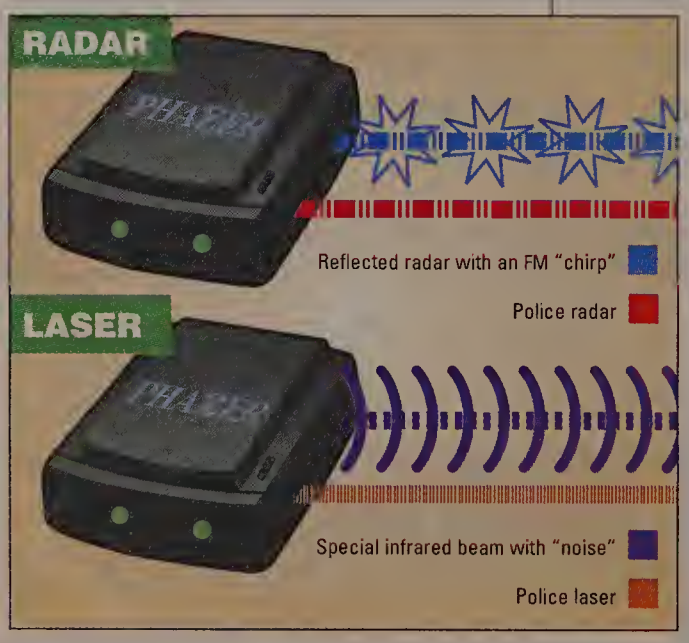
It seems that as speed-detection technology has gotten more and more advanced, speeding tickets have become virtually unavoidable. And although devices exist that enable motorists to detect these speed traps, they are outlawed in many states... including mine.

The solution. Today, Rocky Mountain Radar offers drivers like me a perfect solution—the Phazer. Combining a passive radar scrambler with an active laser scrambler, the Phazer makes your automobile electronically "invisible" to police speed-detecting equipment.

The radar component works by mixing an X, K or Ka radar signal with an FM "chirp" and bouncing it back at the squad car by way of a waveguide antenna, effectively confusing the computer inside the radar gun. The laser component transmits an infrared beam that has the same effect on laser Lidar units.

Shown actual size, the Phazer is only 3"W x 4"L x 1.5"H!

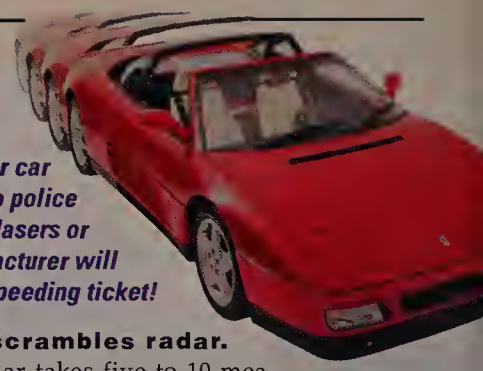
Perfectly legal. Some radar devices have been outlawed because they *transmit* scrambling radar beams back to the waiting law enforcement vehicle. The Phazer, however, *reflects* a portion of the signal plus an added FM signal back to the police car. This, in effect, gives the waiting radar unit an electronic "lobotomy." Best of all, unless you are a resident of Minnesota, Oklahoma or Washington, D.C., using the Phazer is completely within your legal rights.



HOW TO MAKE YOUR CAR DISAPPEAR

Radar and laser scramblers are devices that foil speed traps by making vehicles electronically "invisible" to police radar. Radar scramblers mix a portion of the radar signal with background clutter and reflect it back to the squad car. This technique, pioneered by Rocky Mountain Radar, creates an unreadable signal that confuses the computer inside the radar gun.

The laser scrambler in the Phazer works in a similar manner. It transmits a special infrared beam with information designed to scramble the laser signal. The result? Readouts on police radar and laser guns remain blank. As far as the police officer is concerned, your vehicle is not even on the road.



■ *The Phazer makes your car invisible to police radar and lasers or the manufacturer will pay your speeding ticket!*

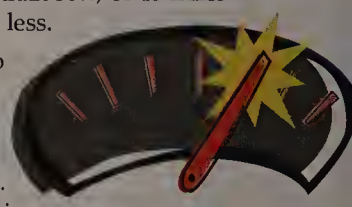
How it scrambles radar. Police radar takes five to 10 measurements of a vehicle's speed in about one second. The Phazer sends one signal that tells the radar the car is going 15 m.p.h. and another signal that the car is going 312 m.p.h. Because police radar can't verify the speed, it displays no speed at all. *To the radar gun, your car isn't even on the road.*

Works with laser, too! The Phazer also protects your vehicle from Lidar guns that use the change in distance over time to detect a vehicle's speed. The Phazer uses light-emitting diodes (LEDs) to fire invisible infrared pulses through the windshield. Laser guns interpret those pulses as a false indication of the car's distance, blocking measurement of your speed. *Again, it's as if your car isn't even on the road.*

Range up to three miles. The Phazer begins to scramble both radar and laser signals as far as three miles away from the speed trap. Its range of effectiveness extends to almost 100 feet away from the police car, at which point you should be able to make visual contact and reduce your speed accordingly.

Ticket rebate program. Rocky Mountain Radar is so confident that the Phazer will protect you from both radar *and* laser speed-detection devices that if you do get a speeding ticket within the first year while using your Phazer, they will pay your fine!

Encourage responsible driving. While the Phazer *is* designed to help you (and me) avoid speed traps, it *is not* intended to condone excessive speeding. For that reason, the manufacturer will only pay tickets where the speed limit was not exceeded by more than 30%, or 15 miles per hour, whichever is less.



Risk-free. Thanks to the ticket rebate program, speed traps don't make my heart skip a beat anymore. Try it. Your car will be invisible to police radar and laser, or the manufacturer will pay your fine! It's backed by our risk-free trial and three-year manufacturer's warranty. If you're not satisfied, return it within 90 days for a full "No Questions Asked" refund.

■ *The Phazer is a completely legal way to protect yourself from speed traps (except in OK, MN and Washington DC).*

The Phazer . . . . . **$199** $14 S&H

Please mention promotional code **1901-MM-1106.**

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Grab video images from any VCR, TV, camcorder into your PC

GrabIT!

Take a snapshot of your favorite video from any video source in 16.8 million colors. You can use it for your cool web page publishing, multimedia presentations, disk-based catalogs, personal photo album, image database, digital greeting cards, newsletters, E-mails and more. The applications are only limited by your imagination.

It's Easy to use

1. Simply plug in GrabIT and connect it to a video source
2. Preview motion video as it sequences through 6 preview screens
3. Simply click [save] button on one of the 6 screens to complete

Unique software interface. When capturing from a full motion video, it is not always easy to get the right picture at the right instance. GrabIT gives you 6 frames to choose from at any one time. No frustration from getting the right image.

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FEATURES

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Includes $99 worth of Award-Winning PhotoMorph 2 software CD-ROM. A Powerful Video Editing and Morphing Software

PhotoMorph 2 is undoubtedly the most highly acclaimed video special effects package ever created for the Windows PC. Its claim to fame is simple: bring images, stock photos, and video clips to create compelling, high quality video productions with ease. With six elegant effects editors and hundreds of special effects, a complete plette of video amazement makers can be found in PhotoMorph 2. The CD-ROM includes PhotoMorph 2 software, PhotoMorph 2 tutorials, over 250 images ready to be used in your video products, nearly 100 PhotoMorph projects and much more.

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Circle 19 on reader service card

The smallest, lightest, **brightest** multimedia projector is now an even brighter **choice.**

Turn your bright ideas into brilliance. Introducing the Epson ELP-3300, the world's smallest, lightest and brightest multimedia projector. Now you can make brilliant presentations anytime and anywhere without turning off the lights.

The world leader in high performance, portable projectors. The revolutionary ELP-3300 shines 75% brighter than ordinary single-LCD projectors, is about the size of a briefcase and weighs less than 17 pounds. Epson's breakthrough prism technology and three separate Poly-Silicon LCD's generate incredible detail, visibly better brightness (350 lumens) and superior color reproduction.

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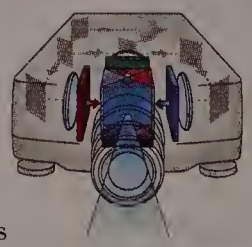
MACUSER EDITORS' CHOICE AWARD 1995 FINALIST

PRESENTER'S CHOICE Presentations Magazine



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Making Bootable CD-ROMs Gets Expensive

BY PATRICK MARSHALL AND TOM MARSHALL

I'VE HEARD IT'S possible to create bootable CD-ROMs that I could use when I start my system. I'd like to create such a disc with my CD-Recordable drive. Do I need a special software package or additional hardware?

Rob H. Royse, Chicago

YOU CAN INDEED create bootable CD-ROMs, and you will need special software. Also, anyone who wants to use the disc to boot their system may need a new controller card for the CD-ROM drive. But this is a pricey proposition, so you may want to think twice.

We're aware of only one commercially available program that lets you create bootable CD-ROMs: Creative Digital Research's $495 CDR Publisher HyCD. Before you try to boot from the bootable CD-ROM, make sure your SCSI or EIDE controller supports booting from CD-ROMs. You can find out if yours does by calling the manufacturer or checking your system's documentation.

• CDR Publisher HyCD $495; Creative Digital Research; 408/255-0999; http://www.cdr1.com

READER SERVICE NO. 738

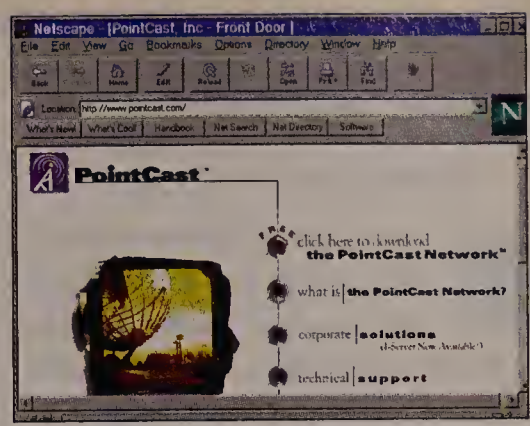
POINTCAST POSES NO CONFLICT

WHAT WILL HAPPEN IF I download the PointCast Network from the Web? Will it interfere with Netscape Navigator?

Maricela Solis, Internet

DON'T WORRY. PointCast Network, which automatically downloads news and other types of data from the Web, works well with Netscape Navigator versions 1.22 and later. Once you've downloaded the PointCast software (which is free) from http:// www.pointcast.com, you can set up your personal profile of interests, including sports scores, company information, horoscopes, and weather forecasts for selected cities. After that, whenever you make a Web connection PointCast automatically retrieves the types of data you've selected.

The PointCast software also functions as a Netscape Navigator plug-in, allowing you to view the PointCast Network from within the browser. Keep an eye out for similar integration between PointCast and Microsoft's Internet Explorer soon.



POINTCAST NETWORK retrieves only the data you want from the Web. You can use PointCast's browser or Netscape Navigator.

CAN I WEAR OUT A CD-ROM?

I WANT TO BUY a CD-R drive, but I've heard that some CD-R drives do not burn deep enough, so after a few uses, CD-ROMs recorded with them become unreadable. Is this true?

Mark Beltran, Internet

ABSOLUTELY NOT. CDs aren't like old vinyl LPs, which could be worn down by the friction of a needle. A drive reads data from a CD by using light; you can't wear out a disc, even if you play it thousands of times. If the CD-R drive is able to lay down readable tracks, you're in business.

DOS LEAVES JOYSTICK JOYLESS

DO YOU KNOW of any MS-DOS drivers that will work with my Microsoft SideWinder 3D Pro joystick? I'd like to program the extra buttons on the base to correspond to keyboard keys.

John Havercroft, Internet

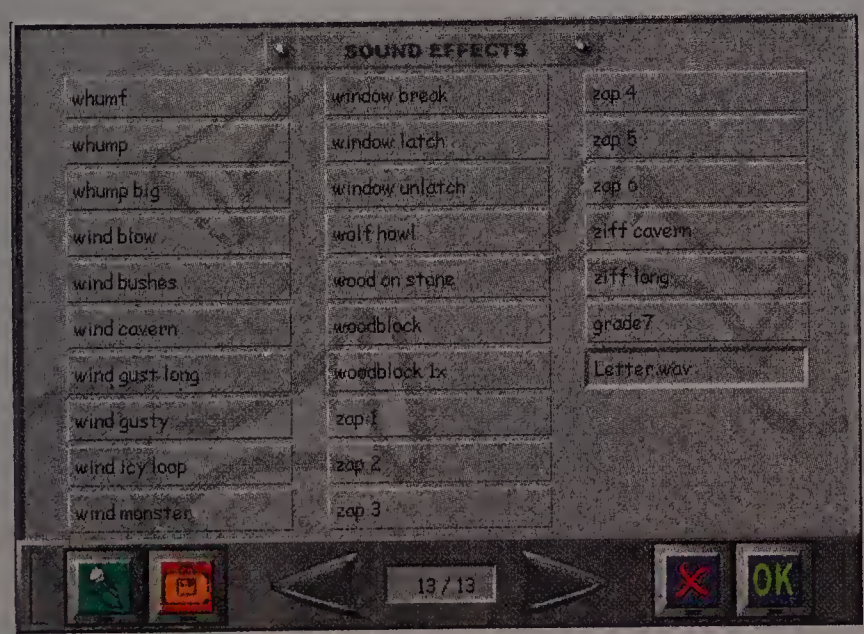
IT'S UP TO THE individual game manufacturer to provide joystick drivers. Alas, we're not aware of any DOS games that come with drivers that take advantage of the SideWinder Pro's extra buttons. ▶

Windows 95 Makes Sound Recording a Snap

My daughter uses Microsoft's 3D Movie Maker to create animated reports for school, but she runs into problems with sound. Specifically, the sound recorder in the software doesn't seem to work very well. Even worse, the recorder allows only a 10-second sound bite.

The answer? Forget the 3D Movie Maker recorder and call up the Sound Recorder utility in Windows 95 by selecting *Start•Programs•Accessories•Multimedia*. You can then record a sound file by selecting *File•Open* and navigating to the source you want to record. If you want to record your own voice, for example, select *File•New* and start talking into your PC's microphone. Then save the audio as a .wav file and import it into 3D Movie Maker. The sound is much better, there's no 10-second limit, and you get more control over the playback.

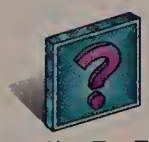
Jean Arnold, Los Angeles



MICROSOFT'S 3D MOVIE MAKER offers plenty of sound files, but what if you want to create your own? You'll have more success using Windows' Sound Recorder and importing the sound files into 3D Movie Maker.

AUDIO

SOUND CARD CONFLICT?



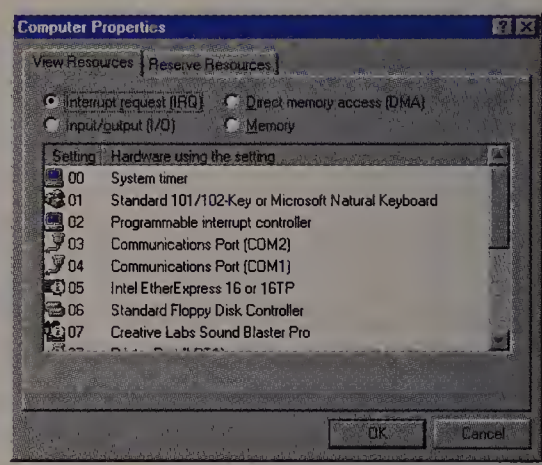
I HAVE A TOPTEK Golden sound card, which is compatible with the Sound Blaster Pro. After installing the TopTek card, I upgraded from a 486DX2 machine to a DX4, and my problems began. When I started Doom and Doom2, the main menu would launch and then turn into some kind of reverse video where the colors were messed up. I finally narrowed the problem down to my sound card, because when I configured the games without sound effects, the games ran fine. Any ideas?

Aldo Baez, Internet

WHEN A DEVICE works under some circumstances but not others, the problem is usually a conflict among system resources. Resource conflicts most often involve settings for an interrupt request channel, an I/O port address, or a direct memory access channel. Conflicts arise when two or more devices are assigned to the same IRQ, I/O address, or DMA channel and you attempt to use the devices at the same time.

In your case, the conflicting devices appear to be your sound card and video system. In the future, you can narrow down your problems by taking certain steps:

Shut down the system and temporarily remove all nonessential cards, including SCSI interfaces, but leave the video adapter in place. Write down all the cards' settings for IRQ, DMA, and I/O ports. Reboot to see that the bare-bones system works, then reinstall cards one at a time, beginning with the sound card. When the problem recurs, you'll know the last card added conflicts with something. Try changing its settings to an unused channel and address; you can usually do this



IF YOU NEED TO CHECK on which devices are using which IRQs, memory addresses, and DMA channels, try Windows 95's handy Device Manager utility.

by changing jumpers on the card. We know the procedure sounds laborious, but there's really no better way if you don't own a Plug and Play–compatible system. And once you've done this, you'll have the needed information recorded and won't have to repeat the process.

Another potential problem—especially if your graphics adapter is involved—occurs when a memory manager, such as EMM386 or QEMM, tries to use memory space needed for video RAM. Troubleshooting such contentions is a matter of adding statements one at a time to the manager's config.sys line to explicitly exclude ranges of video memory from upper memory management. Reboot ▶

TERRAGLYPH

BUSTER AND THE BEANSTALK™

TINY TOON Adventures™

"Sets the standard" Billboard
"Amazing" Children's Software Revue
"Stands out from the competition" Billboard
"Cool" Los Angeles Times

Critics across the country have praised this award winning interactive cartoon based on the Tiny Toon Adventures hit TV series. Buster and the Beanstalk gives your kids the chance to guide Buster Bunny and Plucky Duck as they journey through a fairy tale landscape. It's a fantasy world filled with fun and unexpected surprises!

Designed for Microsoft Windows 95

Tiny Toon Adventures, characters, names, and all related indicia are trademarks of Warner Bros. © 1996 Windows is a registered trademark of Microsoft Corporation.

Circle 216 on reader service card

after each change to see if the problem disappears. (This process is documented fully in third-party memory managers, so consult your user manual.)

Finally, if your problem arises only after you've set up a Plug and Play–compatible motherboard, you most likely need to assign an IRQ setting for each older, non-PnP device that's in the motherboard's setup routine.

To access this routine, you usually press **<Delete>** while the system is booting up, then choose *Plug and Play Setup* from the setup menu. This tells the BIOS to reserve the IRQ that will be used by a legacy card, so the system doesn't assign it to some other component.

You may still need to set jumpers and switches on the card itself. Windows 95 has a built-in way to troubleshoot IRQ addresses: From the *Start* menu choose *Settings•Control Panel* and double-click the *System* icon. Click the *Device Manager* tab and then the *Properties* button.

VIDEO

WHAT'S VESA?

WHENEVER I TRY TO LOAD a new CD-ROM game, I get an error message saying my VESA driver is not installed. What is a VESA driver, and how do I install it?

Sy Farmington, Green Bay, Wisconsin

A VESA DRIVER is software that tells your super-VGA card how to display a program on your screen. The VESA standard was developed by the Video Electronics Standards Association to simplify the task of programming DOS applications for resolutions higher than the standard VGA resolution of 640 by 480.

Some graphics adapters come with VESA support built into their SVGA BIOS, but the error message you've been seeing indicates that your graphics adapter doesn't support it. The solution? Just load a VESA driver at the DOS command line.

VESA drivers are usually included both with graphics adapters and with the games that need them. (You can also download the latest version from the Web site of your graphics adapter manufacturer.) Installation is usually a matter of copying the file to your hard drive and including a statement in your autoexec.bat file to load the driver whenever you boot. But to avoid creating new problems, be sure to follow the specific directions that are included with the driver.

By the way, Windows doesn't need VESA drivers because it provides generic SVGA drivers for 800-by-600 resolution. Resolutions higher than 800 by 600 require Windows drivers written specifically for each adapter and supplied by the card's maker.

Patrick Marshall is research manager for InfoWorld's *Reviews and Testing department. Tom Marshall is a freelance writer specializing in computer technology.* Multimedia Q&A *welcomes your questions and solutions. See page 14 for contact information.* ■

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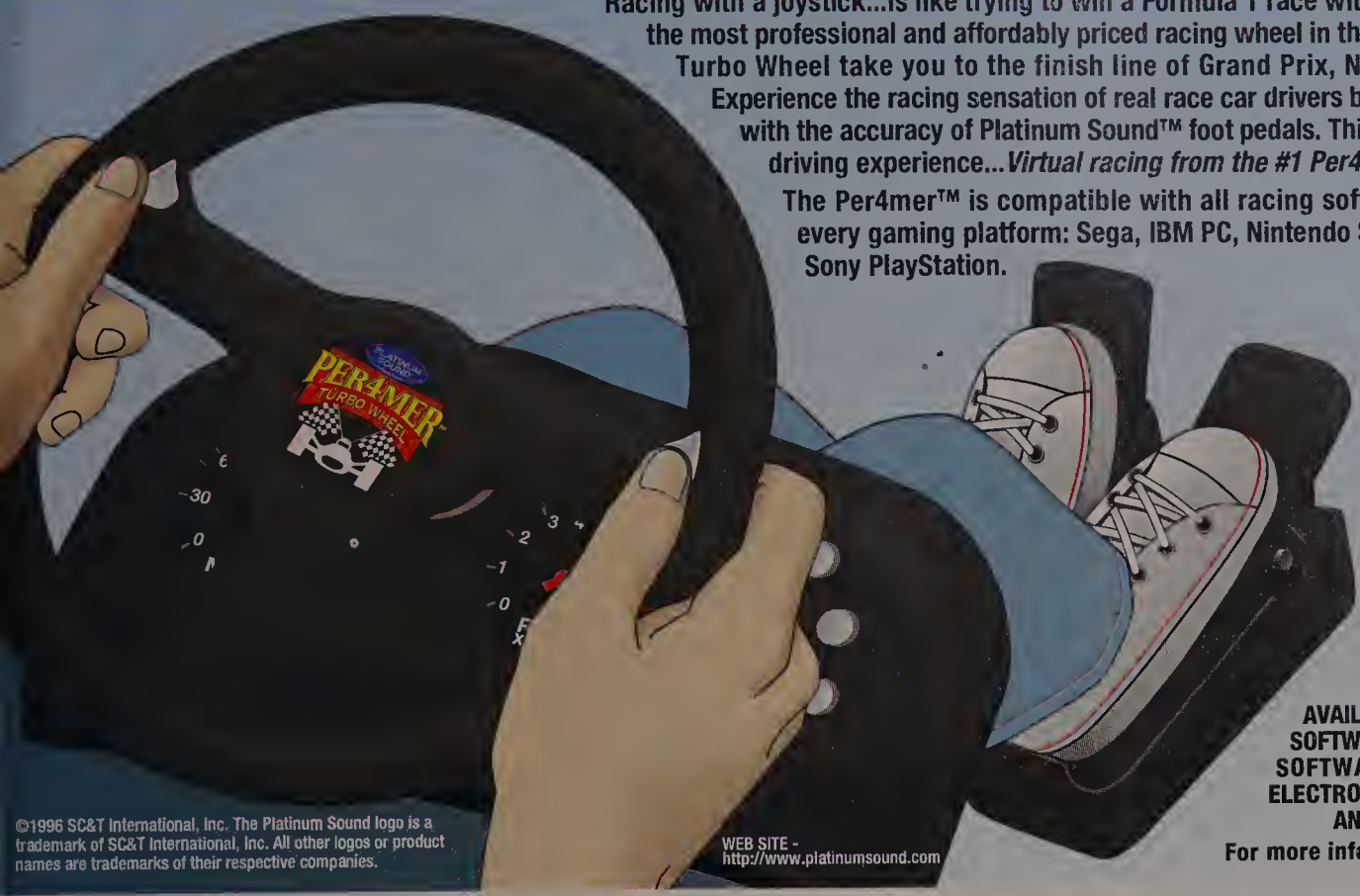

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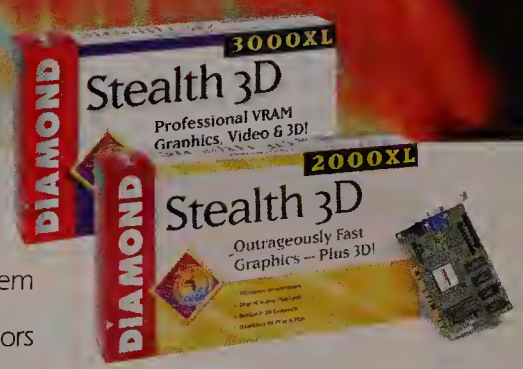

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Bundled Software*	• Descent II • Compton's Interactive Encyclopedia 1996 • Destruction Derby	• Descent II • Compton's Interactive Encyclopedia 1996 • 3D F/X • Digital Video Producer • MS Internet Explorer

Stealth 3D 2000/3000 Comparison

	Stealth 3D Family	MATROX MGA Millennium
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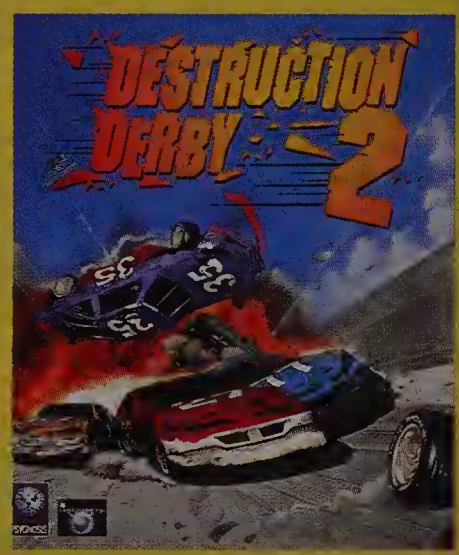

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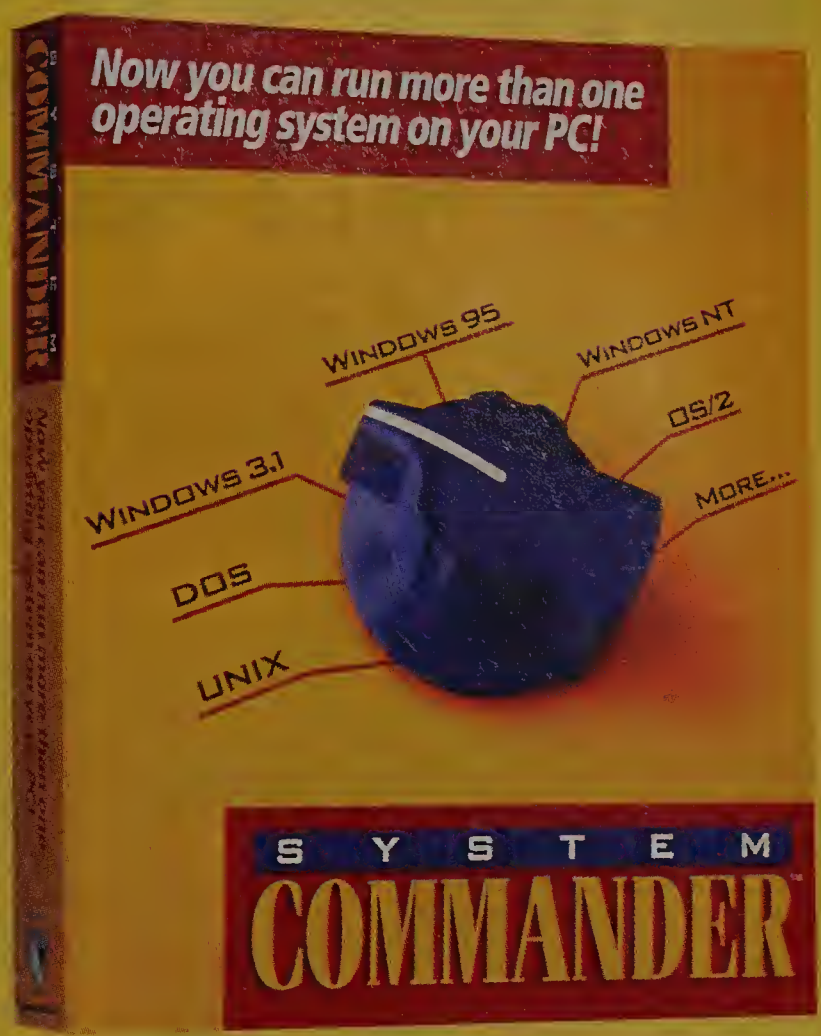

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HERE'S HOW

REAL PROBLEM, REAL SOLUTION

Should we pass on Windows 95 and upgrade to Windows NT instead? —*Joseph Schwartz*

WINDOWS 95 WAS NOT THE BEST OPTION for Bankers Trust, says Joseph Schwartz.

THE WINDOWS 95 marketing typhoon blew thousands of organizations into massive upgrades from Windows 3.1. But other companies decided to pass on Win 95 and adopt a more robust operating system instead. This month Joseph Schwartz, a technology consultant for Bankers Trust Company in New York City, explains why the huge financial services firm chose Windows NT.

—*Editor*

PROBLEM: THE NEED FOR A BULLETPROOF PLATFORM

WINDOWS 95 IS A GREAT EXAMPLE of an interim software release that's targeted squarely at the consumer market. With its support for 32-bit applications and its multimedia-oriented environment, it's a no-brainer for organizations or individuals running 486-grade machines and in need of an improvement over the now-ancient Windows 3.1.

But for everyone else, Windows 95's time may have already come and gone.

That's the case for the computer-intensive world where I work, in which Pentium-class machines are the de facto standard. Bankers Trust—a New York City–based wholesale commercial banking company—runs a huge number of powerful computers in a chaotic trading environment. It's not uncommon to see a trader looking at a live market feed on his PC, modeling a transaction in Excel, answering e-mail, and creating a word processing document—all at the same time. One Bankers Trust trader in London put seven Pentium workstations on his desk, each running dozens of applications simultaneously.

Several years ago Bankers Trust retained me as an independent technical consultant. My consulting firm, Hanover Square Associates (hanover@inch.com), works very closely with the company.

Bankers Trust had long run Windows 3.1 on 12,000-plus desktop 486-class PCs, all connected via NetWare networks and other networks.

While Windows 3.1 let users cut and paste between applications on a single computer, it was never robust enough to support all kinds of Windows and DOS-based applications at one time.

Many of the bank's power users needed several PCs to support multiple applications—but then lost the ability to share information among those applications via Windows' Clipboard. All these computers also took up an incredible amount of desktop real estate, and the added burden on the network could bring communications to a crawl. Nor did Windows 3.1 provide the security at the desktop level that bankers need to protect financial and customer information.

For Bankers Trust, the issue was not whether to upgrade from Windows 3.1, but when.

SOLUTION: WINDOWS NT ON THE WORKSTATIONS

IN 1991 WE BEGAN THE hunt for a secure, robust operating system that could run many applications at once on a single workstation.

Any time you're thinking about switching operating systems in a big company, you're talking about a huge, expensive

undertaking. Bankers Trust couldn't afford a wrong move. (Switching from Windows 3.1 over three years has been a multimillion-dollar expenditure in hardware, software, networking, and support.)

After the first beta copies of Windows NT Workstation arrived at Bankers Trust, several hundred technologists spent more than 18 months evaluating and testing it as a development platform as well as an operating system for user workstations.

Because of our investment in Windows applications, we could never consider IBM's OS/2 to be an alternative system.

But during that testing period, we also got plenty of sneak peeks at another multitasking operating system—Windows 95. We were well into our evaluation of NT by then, however, and our look at Win 95 told us it would never be an option: Windows NT was easily the hands-down winner.

'Windows 95's time may have already come and gone.'

For one thing, Windows 95 lacks a protected kernel, so it isn't crashproof, as Windows NT is.

Nor is Windows 95 as secure as NT.

We planned to upgrade all our hardware, so we didn't need support for non-Pentium machines.

We didn't foresee a lot of multimedia-focused requirements that would have made Windows 95 nice to have.

And finally, Windows 95 would have forced us to retrain scores of users to work with the new interface. At the time, Windows NT had the same user interface as Windows 3.1, so we avoided that problem, at least for the moment. (The newly arrived Windows NT 4.0 does feature the Windows 95 interface.)

Windows NT isn't perfect. Integrating not only NT workstations but also Windows NT Server into our existing networks was no easy task. Unlike NetWare, which provides a variety of useful tools, NT Server is difficult to manage from an administrative point of view. For example, it offers no way to assign read-only file permissions to large groups of users; we had to do this for each individual.

But with the release of Windows NT 4.0, Microsoft has made many improvements to the operating system.

And here's the rub: Microsoft is now in the process of narrowing the gap between its operating systems.

Indeed, Windows 95 is just a transition toward NT. Eventually—as processing power continually increases and 486s and 16-bit applications disappear—we'll all be running Windows NT anyway.

Moving to NT was smart for us: Users can run multiple applications from one workstation, letting us reduce the number of PCs we must support. We've saved hundreds of thousands of dollars in training costs and other expenses by standardizing on a single operating system. By skipping Windows 95, we've banked on the future.

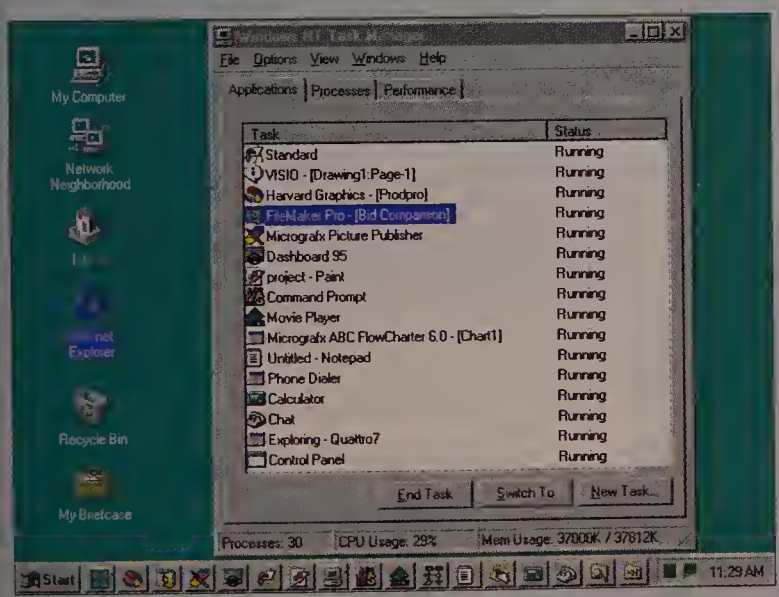
Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.* ■

NT SOLUTION

Windows NT offers major pluses and minuses. Thinking about upgrading? Ask yourself these questions:

- Does Windows NT support all your existing applications?
- Does Windows NT run on all your existing hardware, including all peripherals?
- Are your PCs powerful enough? (Realistically, you want Pentium-grade machines with 16MB of memory at the very least.)
- Do you need a more crashproof platform than Windows 95?
- Do you require more data security than Windows 95 can provide?
- What will it cost to upgrade your software and hardware, and to train users?



WINDOWS NT IS MORE ROBUST than Windows 95, a particular concern for users running many apps. All the packages here are running under Windows NT 4.0 on a PC with 16MB of memory.

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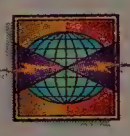

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Recycle CD-ROMs ◆ Send faxes from Exchange ◆ Resize graphics images

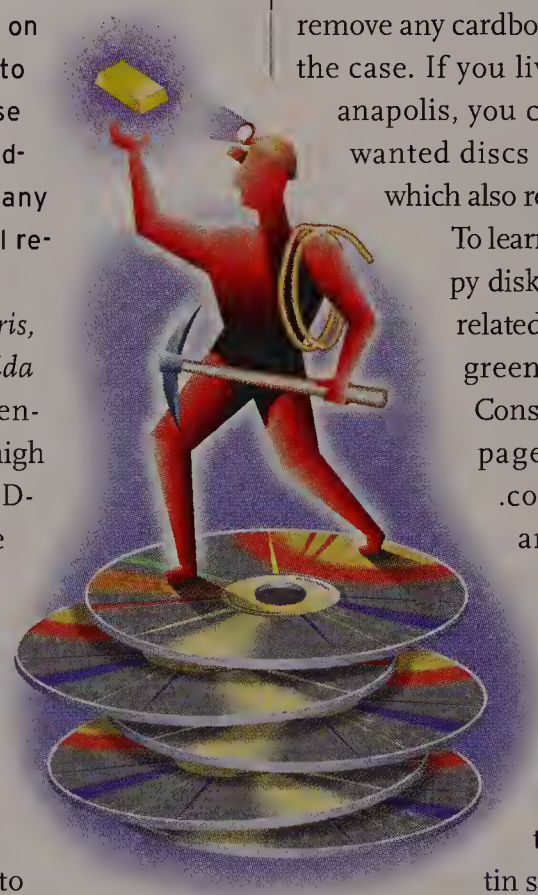
THERE'S ALUMINUM IN THEM THAR CD-ROMS

I'VE GATHERED QUITE A collection of CD-ROMs that are essentially obsolete—they're old versions of programs, free online service software, and CD-recordable discs that are no longer of any use to me.

The situation's not as bad as when everything came on floppies, but I'd like to avoid adding all these discs to the nearest landfill. Do you know of any organizations that will recycle CDs?

Awbrey G. Norris, Winter Springs, Florida

NOW THAT YOU mention it, I've got a foot-high stack of useless CD-ROMs, too. For some reason, I've collected them into a pile (right next to several cartons of America Online floppies) instead of throwing them away.



They're no good to me anymore, unless I can turn them into a work of art or a Halloween costume, but they do have intrinsic value to several companies: Ordinary CD-ROMs contain a layer of aluminum, CD-recordable discs have a layer of gold, and both disc types consist primarily of polycarbonate plastic that can be turned into other plastic products.

That doesn't mean you'll get paid for your surplus CDs or even get reimbursed for the shipping costs, but you'll be doing your part to reduce the burden on Mother Earth by recycling.

GreenDisk in Preston, Washington, takes your CDs, floppies, and magnetic tapes and recycles the materials—the company even sells recycled floppy disks. GreenDisk also runs a corporate software recycling program that takes complete software packages and recycles 99.5 percent of the material, including paper, cardboard, plastics, and distribution media. Each corporation receives a letter certifying that the software package has been destroyed in accordance with the terms of the license.

Digital Audio Disc in Terre Haute, Indiana, takes your old CDs and even the plastic jewel cases they came in. The company asks only that you remove any cardboard or paper from the case. If you live closer to Indianapolis, you can ship your unwanted discs to Plastic Recycling, which also recycles discs and cases.

To learn more about CD, floppy disk, and other computer-related recycling, check Evergreen Industries' Internet Consumer Recycling Guide page (http://www.best.com/~dillon/recycle/), and click the *Guide to hard-to-recycle materials* link. In addition to listing disk recycling resources, the guide suggests cutting CDs that contain sensitive data with tin shears before recycling, to render them unreadable.

• GreenDisk; 800/305-3475, 206/222-7736 (fax); http://imagelinc.com/greendisk/
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• Plastic Recycling Inc.; 317/780-6100
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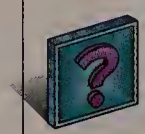
CAN I USE EXCHANGE FAX FROM WORD?



IN YOUR RECENT article on Windows faxing tips ["Fax to the Max," June], you said that to send a fax within an application like Word, a person can choose File•Send. When I do this, Exchange opens and prompts me to send the file as a message. No choice of faxing is given. To fax, I have to choose Compose New Fax from the Start menu, then browse to and attach the file. This is more work than sending the file from within Word. What am I doing wrong?

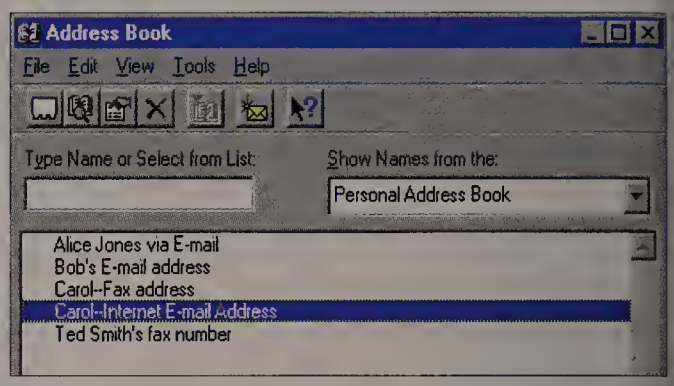


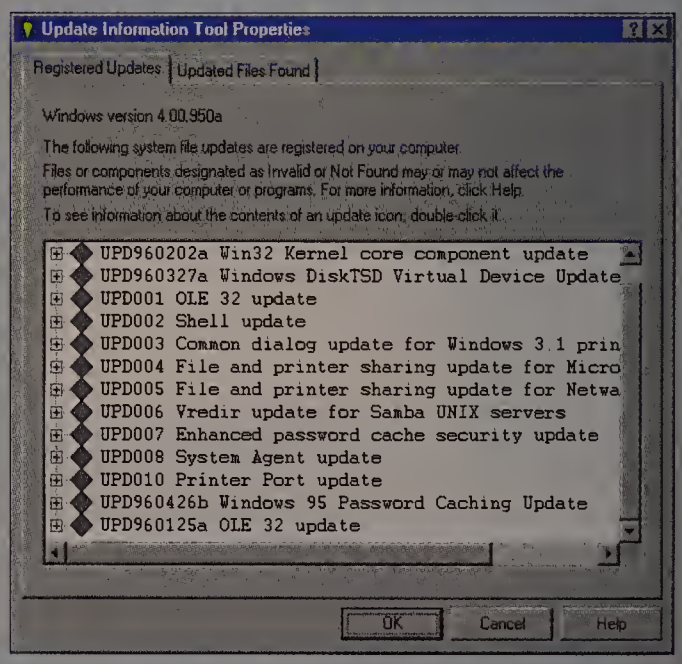
FIGURE 1: OVERCOME EXCHANGE'S address book shortcomings by naming your addressees descriptively.

Dan Heidelberger, St. Petersburg, Russia

NOTHING—YOU'VE JUST RUN into one of Exchange's biggest weaknesses (two of its other weaknesses are the inter- ▶

Windows 95 Bug Fixes

WITH ALL THE WIN 95 patches released since the OS shipped, it's hard to remember which ones you've installed. In addition to the ten fixes in Service Pack 1 (http://www.microsoft.com/windows/software/servpak1/sphome. htm), about a dozen more have dribbled out. Fortunately, Service Pack 1 also includes the Update Information Tool (select *Start•Programs•Accessories•System Tools*), which lists installed system patches, but not those for utilities.



Why 7 out of 10 people choose Family Tree Maker*

"Online links make your research easier."

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#1 Selling and Best Value

hy should you choose the program 7 out of 10 family history thusiasts choose? Quite simply, Family Tree Maker's huge mmunity of users and vast database of genealogy records will lp you find your ancestors. And this award-winning program ves you the best variety of beautiful printouts.

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nlike other family tree programs, Family Tree Maker™ actually lps you find your ancestors. Just click the FamilyFinder™ utton to search a list of 115 million people from centuries of nealogy records. You'll instantly learn where to find more formation about possible ancestors. And, if a distant relative as already traced your family tree, you may find it on one of e accessory CD-ROMs that work with Family Tree Maker. In ct, we have the world's largest collection of actual family ees and genealogy records on CD-ROM. Save precious time hile tracing your family tree from the comfort of your home!

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minable time it takes to load and the approximately 4MB of RAM that it consumes). Exchange's main selling point, however, is that it combines both fax and various flavors of e-mail into a single interface.

All you have to do after opening Exchange is to type any additional text you want the message to contain, then choose a recipient from the address book. This trick also works with the Exchange Client and Windows Messaging updates reported in September's *Bugs and Fixes.*

Here's a place where Exchange baffles everyone: Though the address book lists your recipients by name, each entry may contain either a fax or an e-mail address, but not both. Worse, there's no way to easily tell the two address types apart. If you send e-mail to Carol but also need to send her a fax from time to time, you'll have to create two separate entries and give them names like 'Carol—Internet E-mail Address' and 'Carol—Fax address' (as in **FIGURE 1**). Since Exchange supports multiple address books, one simple solution would be to segregate fax addresses into a separate address book. Unfortunately, however, Exchange doesn't allow mere end users to create and use separate address books; and so far, the only other address books allowed are those that are created by other mail services, such as CompuServe's or the Microsoft Network's. Hello, Microsoft?

RESIZE IMAGES WITHOUT DISTORTION

I NEED SOME HELP resizing JPEG, GIF, and other image files. When I resize an image so that it fits better on a page, it usually becomes distorted or blurred, and some rows or columns of pixels appear disproportionately large or small.

I have several good image editing programs—including Corel PhotoPaint, HiJaak Pro, and Paintshop Pro—but none of them seems able to resize an image without distorting it.

Bill Williams, Cocoa, Florida

BIT MAPS LOOK BEST when you reduce them by a factor that divides evenly into the original image's width or height (or both). For example, reducing a 640 by 480 image to 320 by 240 (a 50 percent reduction) yields fairly good-looking results because the paint program simply takes adjacent pixels, averages their colors, and then creates a single new pixel with the resulting value.

Reducing the same image by a ratio that forces that paint program to average an uneven number of pixels into one pixel creates noticeable distortion—jaggies, illegible type, loss of detail and subtle shading, and vertical and horizontal lines that look too thick or too thin. The smaller your images are, the more noticeable the problem becomes; and of course, the smaller you make them, the more detail you lose from the original image.

The solution to this problem is to transcend pixels altogether and use a vector-based graphics format, such as Encapsulated PostScript (EPS). Unlike bit-mapped files, which simply describe images as a matrix of colored dots, vector-based files build images from mathematical equations. This approach enables you to resize a vector-based graphics image without encountering the pixel-averaging errors that bit-map images are prone to (see the examples in **FIGURE 2**).

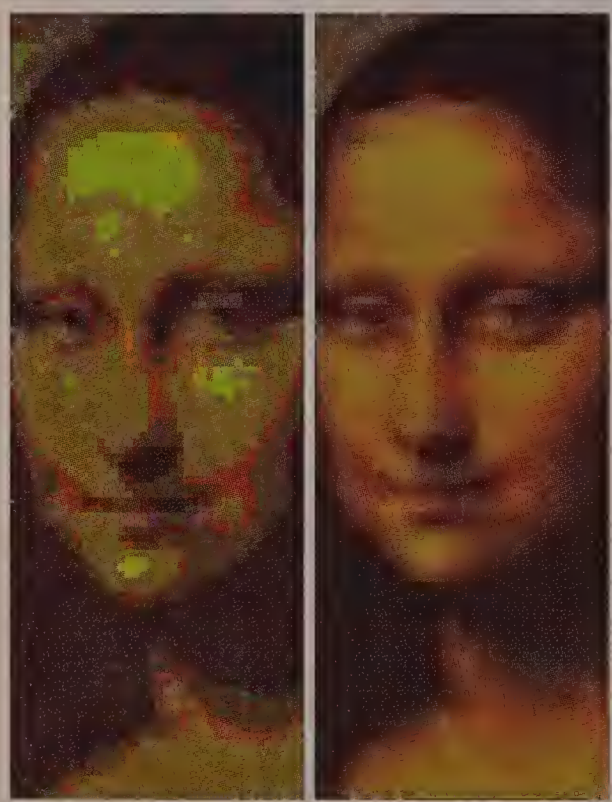


FIGURE 2: RESIZE A BIT-MAP IMAGE of Leonardo's Mona Lisa (left), and she looks more like one of Picasso's cubist ladies. The solution: Convert the bit-map file to an EPS file (right).

MY FUNNY FILE OPEN DIALOG BOX

IN JULY'S *Help Line,* a section at the bottom of page 238 shows a file open dialog box from a Win 95 application. It has more options than my file open dialog box in Win 95, including search, preview, and properties options. Is this a special feature that I need to buy, or am I just not opening the right dialog box?

Brad Bolender, Internet

THE ACCOMPANYING TEXT says the enhanced dialog box shown is available in "many" Win 95 applications. Specifically, it's a custom dialog box available to Microsoft's Office 95 applications. Other 32-bit Windows apps use a default file open dialog box that lacks the search, preview, and properties features, though it does give you Explorer-like powers. Right-clicking any file in a file open dialog box gives you all the file operations available from the context menu in Explorer, including access to third-party utilities like virus scanners and file compressors (see **FIGURE 3**).

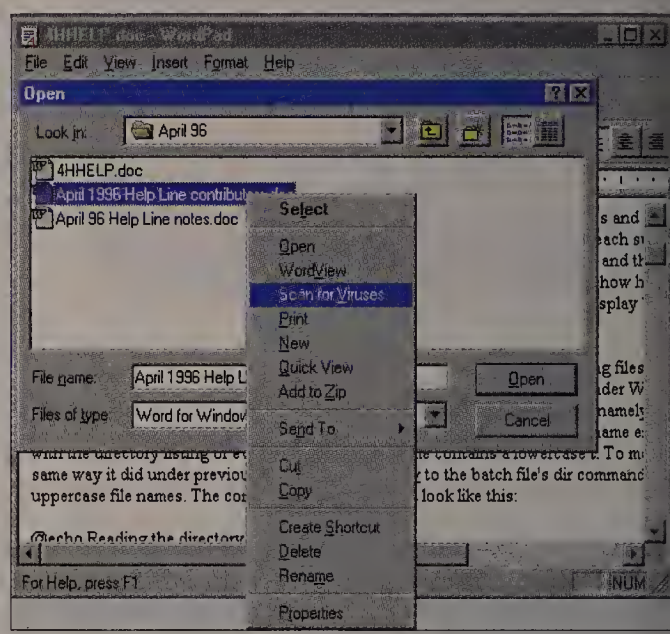
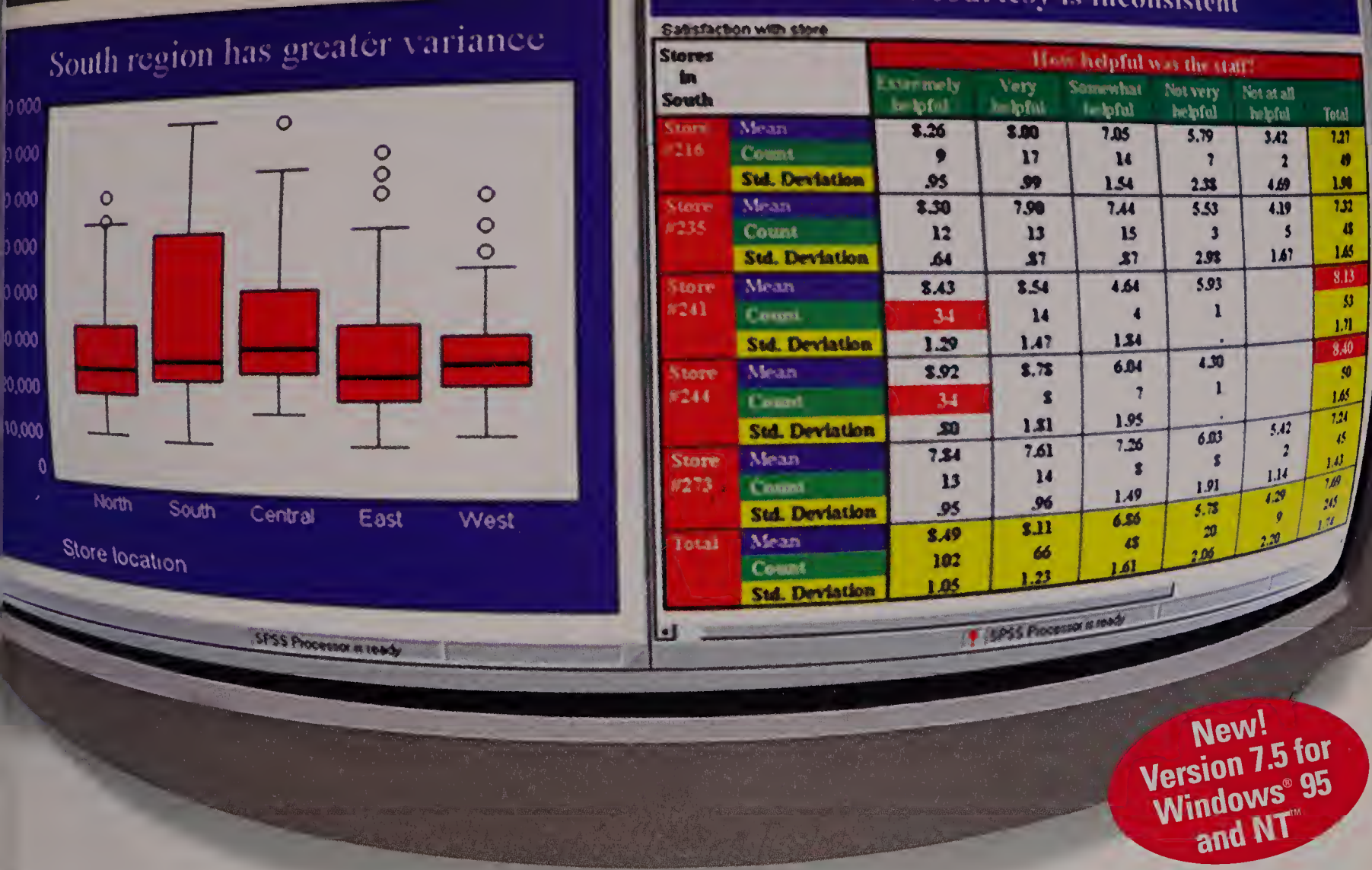


FIGURE 3: IT'S NOT AS GOOD AS OFFICE 95's file open dialog box, but Win 95's default dialog box lets you do anything Explorer will. Just use the right mouse button.

Find additional tips at http://www.pcworld.com/hereshow.html. Answer Line *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Spanbauer is author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240). See page 14 for contact information.* ■



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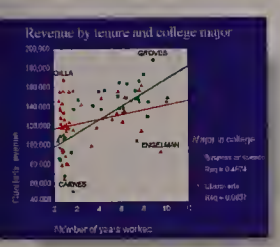

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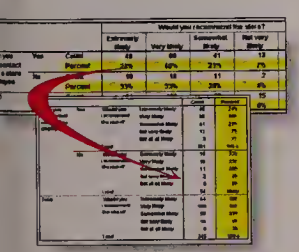

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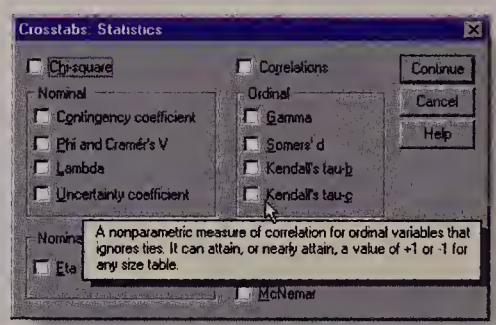
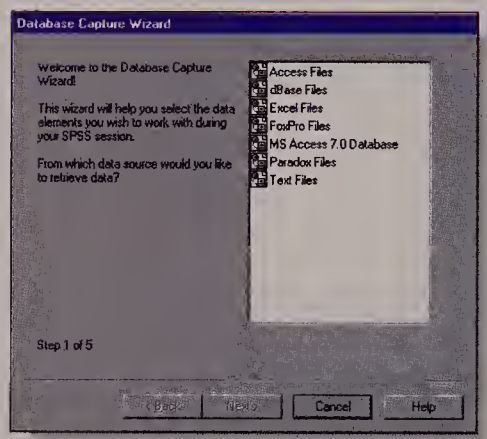


Prepare your data for analysis



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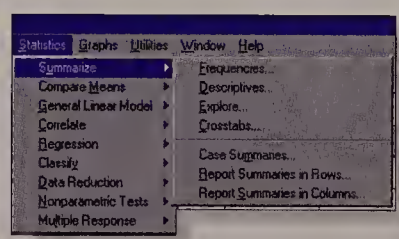

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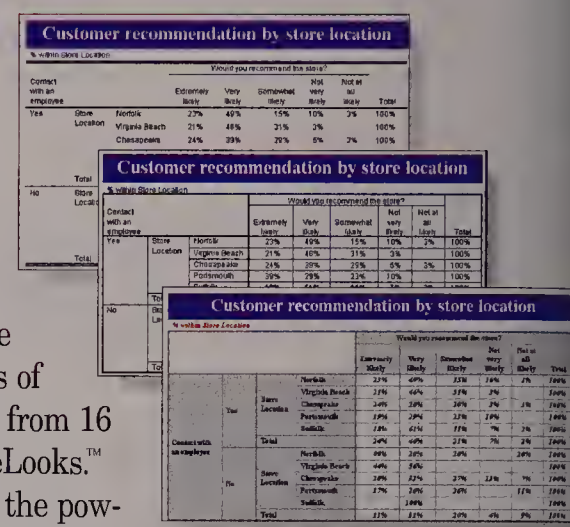

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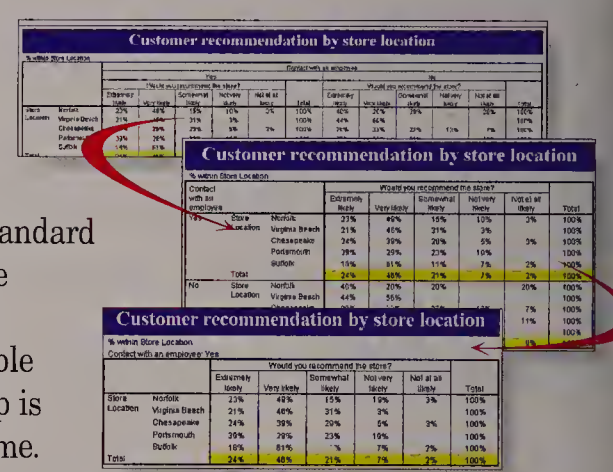

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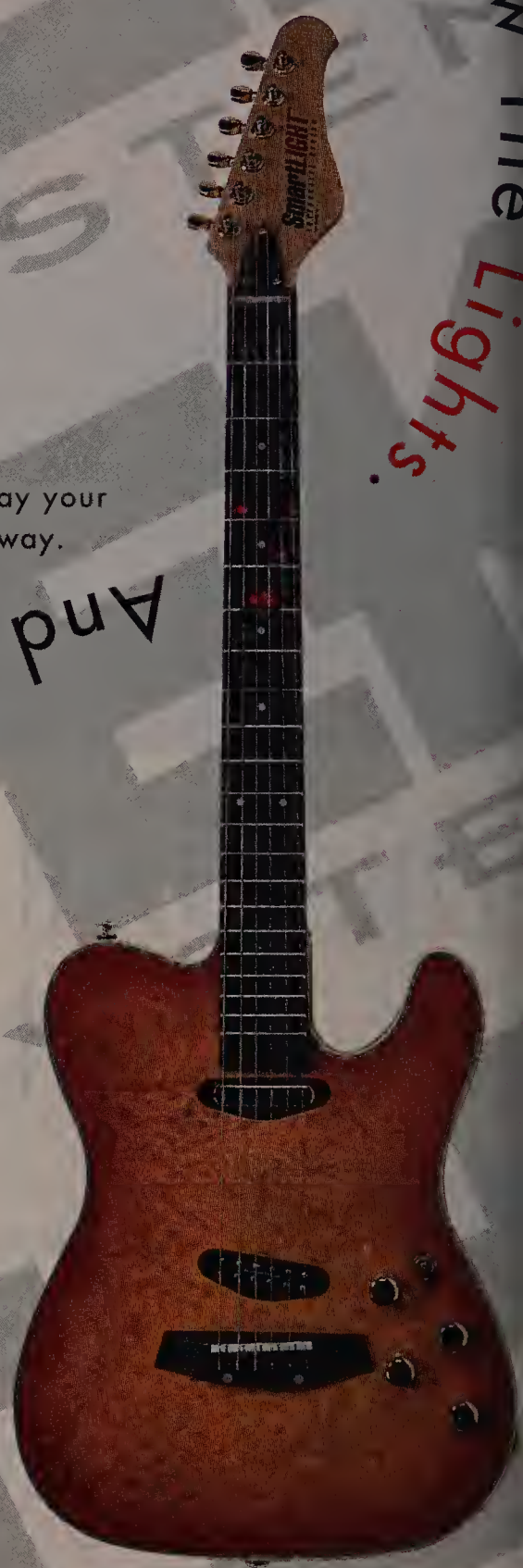

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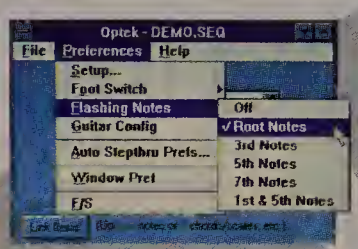

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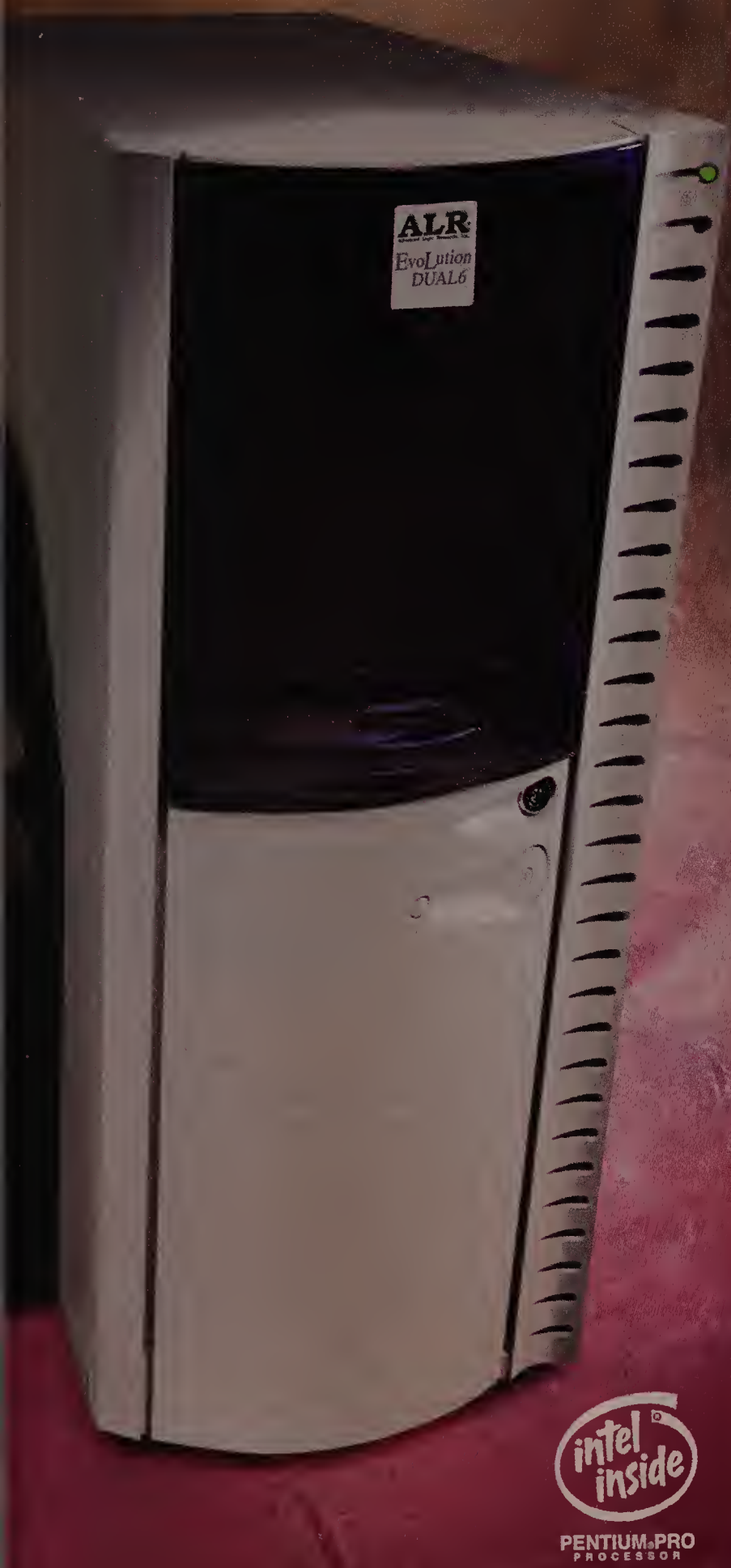

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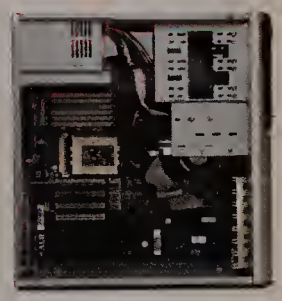

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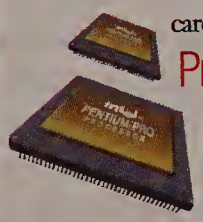

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Hide That Old Logo, Tile Application Windows

WINDOWS 3.X AND 95

TIRED OF SEEING the Windows logo each time you start up? It's easy to make it disappear.

In Windows 95, you can dispatch the logo simply by pressing **<Esc>** as soon as you see it. Here's how to remove it permanently: Start Windows Explorer and choose *View•Options*. In the View tab, click *Show all files* and *OK*. Then look for the msdos.sys file in the root directory of your start-up drive. If you're using DriveSpace or other disk compression software, you'll need to look for the file on your host drive, which may appear with a drive letter like e: or h:.

Make a backup copy of msdos.sys. Then right-click *msdos.sys* and choose *Open With*. Select Notepad or another text editor from the list, and click *OK*.

Under the [Options] heading, look for a line that begins Logo=. If you don't see one, add **Logo=0** after the [Options] line but before the lines beginning with semicolons. Save the file and exit from Notepad. If you get a message that the file is read-only, right-click *msdos.sys* in the Explorer window and select *Properties*. At the bottom of the dialog box (in the Attributes section), uncheck *Read-only* and then click *OK*. If anything goes wrong, restore msdos.sys from your backup.

In Windows 3.*x*, start Windows by typing **win** and a space, pressing **<F7>**, and then pressing **<Enter>**. On screen, the command looks like **win ^@**.

However, if you normally load a program that uses the <F7> function key, use this method instead: First delete an application icon from your Program Manager Startup group. Then when you need to start Windows again, type **win**, a space, and the application's path. For example, if Windows Clock is in your Startup group, delete its icon there and start Windows by typing **win clock.exe** (include the application's path if it's not specified in your DOS path command in autoexec.bat). Naturally you can save some typing by putting this line in a batch file and starting Windows that way.

GET THERE IN TILE

NEED TO LOOK AT MORE than one application window at a time? No problem. In Windows 95, right-click a blank area of the Taskbar and choose *Cascade* (to see a stack of windows, with each offset from the next), *Tile Horizontally* (to see windows arranged in rows), or *Tile Vertically* (to see windows arranged in columns). If you change your mind, just right-click a blank area of the Taskbar again and choose *Undo Cascade* or *Undo Tile*.

To display the Task List in Windows 3.*x*, double-click a blank area of the desktop or press **<Ctrl>-<Esc>**. Click *Cascade* (for a stack of windows) or *Tile* (for vertical tiling). If you want horizontal tiling, just press **<Shift>** as you click the *Tile* button (see **FIGURE 1**).

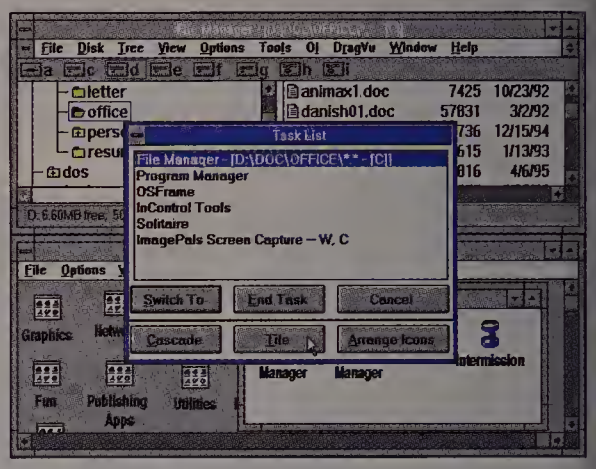


FIGURE 1: TILE WINDOWS horizontally—press <Shift> as you click Tile in the Win 3.x Task List.

Change Help Screen Font, File for Another Extension

WINDOWS 95

DEPENDING ON YOUR screen resolution, you may find the font in Windows 95 Help is too small for comfort or so big it takes up too much screen real estate. This is easy to fix. Just open any Help topic: Choose *Start•Help*, click the *Contents* tab, double-click any book icon to reveal a list of topics, then double-click any ? icon to open a Help topic. Next, right-click in the Help topic window (or click the *Options* button) and choose *Font•Small*, as in **FIGURE 2**, or *Font•Large*. The font size changes instantly and stays that way until you change it again.

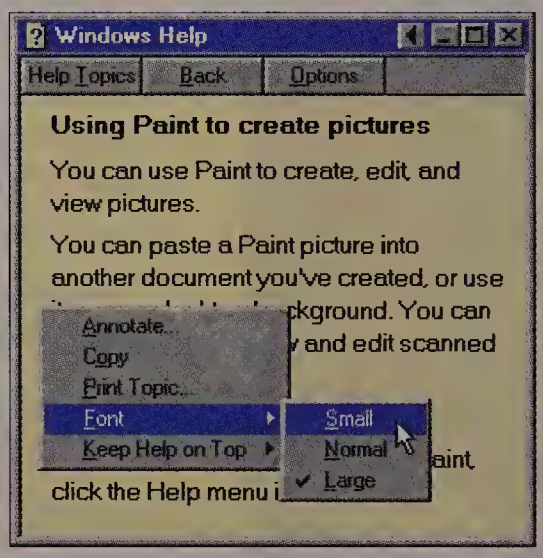
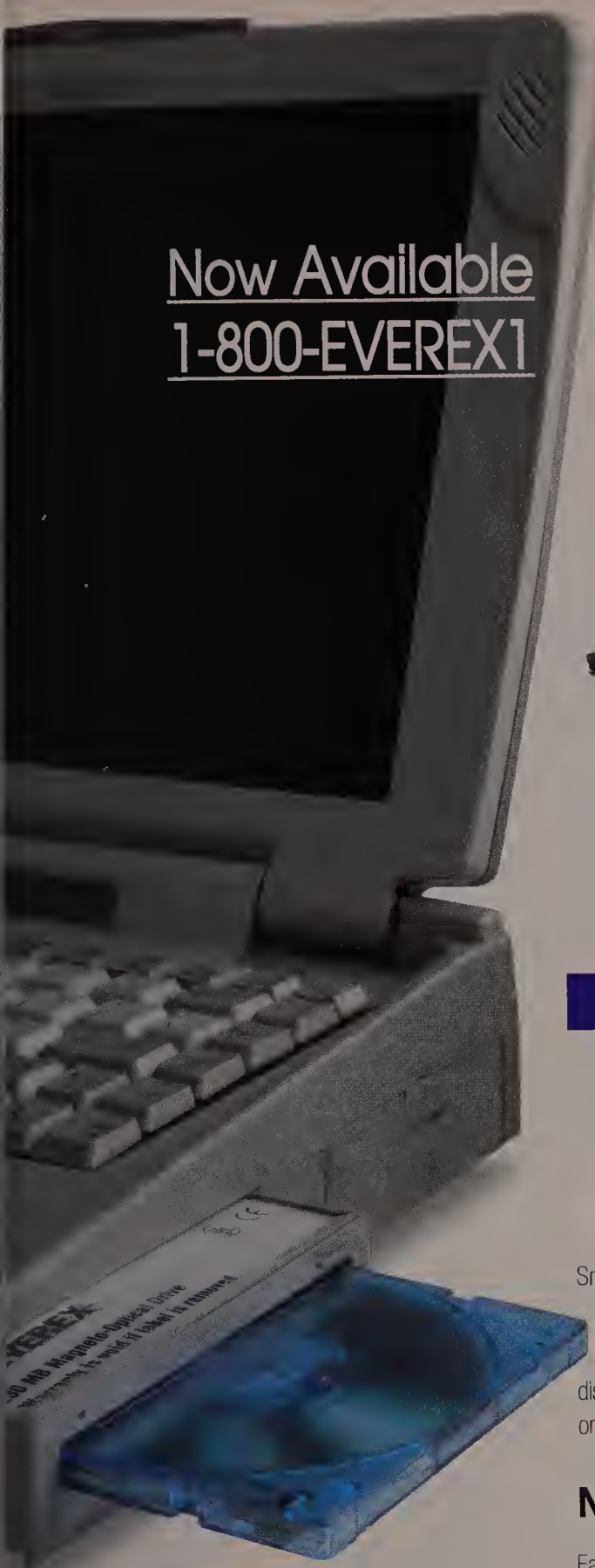


FIGURE 2: MAKE HELP easier to read with a simple right-click to customize the font.

CHOOSE YOUR EXTENSION

SOMETIMES YOU WANT to save a file with an extension other than the one an application normally supports. For example, if you're working in Notepad or WordPad you may want to save a file as Read.Me or NewApp.Java using File•Save As. Notepad and WordPad, however, second-guess your intentions by adding their default extensions to whatever name you use: Read.Me comes out as Read.Me.txt (Notepad) and NewApp.Java comes out as NewApp.Java.doc (WordPad).

Fortunately, you can easily avoid this confusion by registering your pre- ▶



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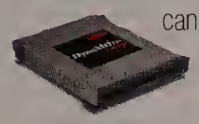

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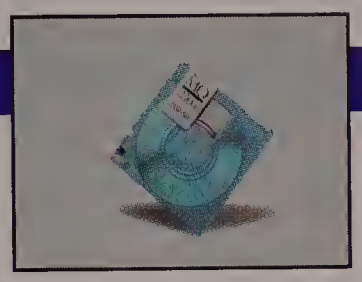

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Circle 107 on reader service card

ferred file extensions with Windows. In My Computer or Explorer, choose *View•Options*. Click the *File Types* tab and then *New Type*. Type a description for the extension you want Windows to understand.

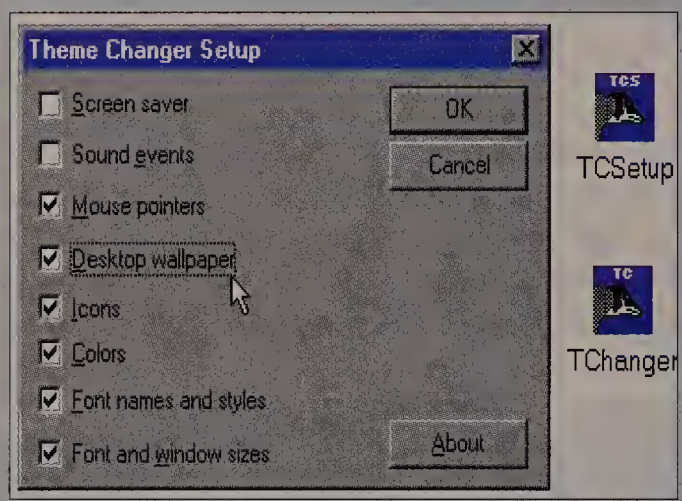
Next, type your associated extension (for example, **java** or **me**). You can make life even simpler by associating this extension with the app you're most likely to use to open it. Under the Actions section of the Add New File Type dialog box, click the *New* button to create a new action. In the 'Action' field, type a name for the action (like **Open**). In the 'Application used to perform action' field, type the full path of your chosen executable file, including quote marks if the path name has spaces (as in, **"c:\program files\accessories\wordpad.exe"**). Click *OK*, and close all remaining dialog boxes.

Tip: If you need to change or remove the extension later, it will be easier to spot if the description you enter begins with the same letters as the extension—for example, "Java code" or "Me file."

WINDOWS TOOLBOX

Automatically Change Desktop Theme

THEME CHANGER from Swoosie Software changes to a different theme in the Microsoft Plus Desktop Themes list each time you run it. For automatic changing, put Theme Changer in your StartUp folder. Freeware. Available as tchng101.zip on PC World Online.



Give Your Mouse a Trail

WINDOWS 3.X

IF YOUR PORTABLE computer has a less-than-perfect screen, you may lose sight of your mouse pointer as it zips from window to window faster than the screen can follow. The solution is easy: Start Control Panel and double-click *Mouse*. Check *Mouse Trails* and click *OK* (see **FIGURE 3**).

Still not good enough? You may need to adjust the length of your mouse trail. If your mouse dialog box doesn't let you do so, just make a simple change to the win.ini file in your Windows directory. In File Manager or Program Manager, choose *File•Run*, type **win.ini**, and press **<Enter>** to open the file in a text editor. Under the [windows] heading, look for a line that begins MouseTrails=. (If you don't see it, add the line anywhere after the [windows] heading but before the next bracketed heading.) To the right of the = sign, type a number from 1 to 7. This represents the number of "echoes" in your mouse trail as you move your mouse.

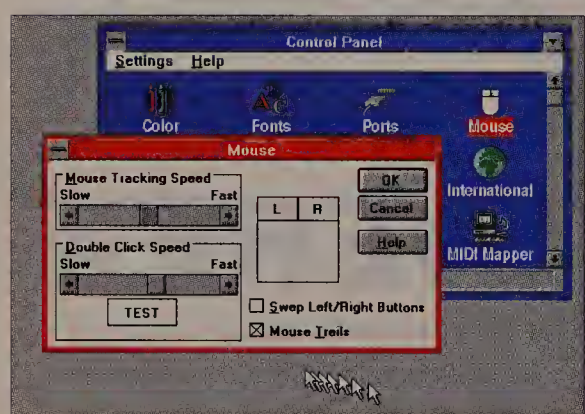
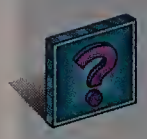


FIGURE 3: TRACK DOWN your mouse pointer with Control Panel's Mouse Trails option.

If your pointer is still hard to see, increase the number; if the trails are too obvious, decrease the number. Then save the win.ini file, and exit your text editor. To see the change, restart Windows.

If you don't see any mouse trails or the Mouse Trails check box is dimmed, you're probably using a video driver that doesn't support this feature. Use Windows Setup to switch to one of the standard generic VGA or super-VGA drivers that come with Windows. ▶

Reassembling Folders From the Recycle Bin

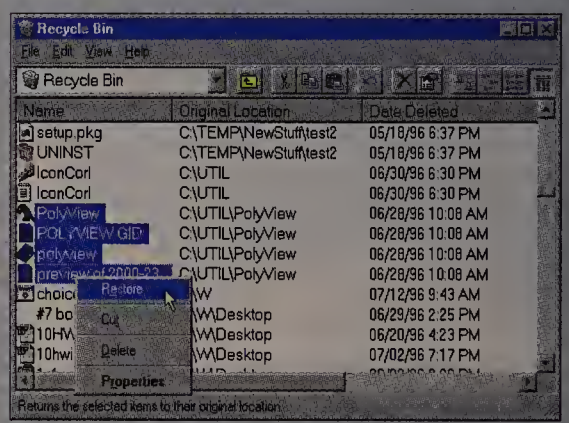


WHEN I DRAG a folder to the Recycle Bin, any files in it don't stay in that folder. All I see in the Recycle Bin is a clutter of different files. This prevents me from dragging a specific folder and all its contents out of the Recycle Bin. Is there any way to have files remain in their folder in the Recycle Bin?

John P. Donaldson, Internet

THE RECYCLE BIN window never displays folders, but you can see the name of each file's originating folder and, by sorting in that view, restore that folder along with its files from the Recycle Bin.

To see the name of a file's original folder, double-click on the Recycle Bin and choose *View•Details*. The Original Location column (see the figure below) shows the path including all the original folders. To restore a folder and all its contents from the Recycle Bin, click on the Original Location column to sort files by their original folders. Then select a folder's files by dragging a box around all its file names. With the files selected, choose *File•Restore* (or right-click on one of the selected files and choose *Restore* from the pop-up menu). This restores the files to their original location and reconstructs all the folders, even the deeply nested ones. To restore just the folder, you must select at least one file in the Recycle Bin and restore it to make Windows reconstruct its original folder.



RESTORE DELETED FOLDERS in Windows 95 by sorting in the Recycle Bin.

Bonus tip: You can save a click by using the right mouse button to drag a selection box around the files you want to restore; when you release the mouse button, the pop-up menu for restoring appears without any additional clicks. One more click and you're done.

New FreeHand™ Graphics Studio™ 7 with Shockwave.™

pan out around the head. It was as simple as rotate, copy, and paste. Then I layered the hi-res images in Macromedia xRes. To get seven fingers on the hands, I cloned a finger in xRes and extended it to look realistic. But I also wanted this image to be surreal, so I used Hue/Saturation to achieve the green effect. Extreme 3D came in handy to model the eyeballs and make them really pop. And voila! My self-portrait." Thanks for the great work, Usok. (And trust us, he's much better looking face to face.)

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Make Your Own Themes, Convert Wallpaper to JPEG

MICROSOFT PLUS

LOOKING TO PUT A little more sparkle on your Windows 95 desktop? Microsoft Plus lets you choose among different themes and their elements—not only for your screen wallpaper but also for desktop icons, mouse cursors, sounds, colors, and more. But you're not stuck with just the themes that Microsoft gives you: By choosing and mixing theme elements, you can creatively make your own. Here's how to go about it.

One step to take before you begin: If you plan to use your custom theme on other computers or distribute it to others, make sure all the sound (.wav), cursor (.cur), animated cursor (.ani), and icon (.ico) files are in your Themes folder (which is in the Plus! folder) or in your Windows folder or one of its standard folders, such as Windows\System.

Now you can customize your Windows 95 desktop. You can make most of these changes from Windows' Control Panel: Just choose *Start•Settings•Control Panel.* Double-click *Mouse* and select the *Pointers* tab to customize cursors; double-click *Sounds* to add your own sound effects to Windows events; and double-click *Display* to change your wallpaper (*Background* tab), screen saver (*Screen Saver* tab), color schemes and system fonts (*Appearance* tab), and desktop icons (*Plus* tab).

Once everything's as you want, double-click the *Desktop Themes* icon in the Control Panel. Make sure *Current Windows settings* is selected in the Theme list at the top of the window, then click *Save As* (see **FIGURE 4,** page 314). Type a name for your theme and click *Save.* By default, themes are saved with the .theme extension in the Themes folder within the Plus! folder.

To distribute your theme for use on another system, copy all the sound, icon, cursor, and wallpaper files your theme uses, along with the .theme file itself, to the second PC (it must use the same folders—Windows or Themes—as the original). To select your theme, use the second PC's Desktop Themes control panel.

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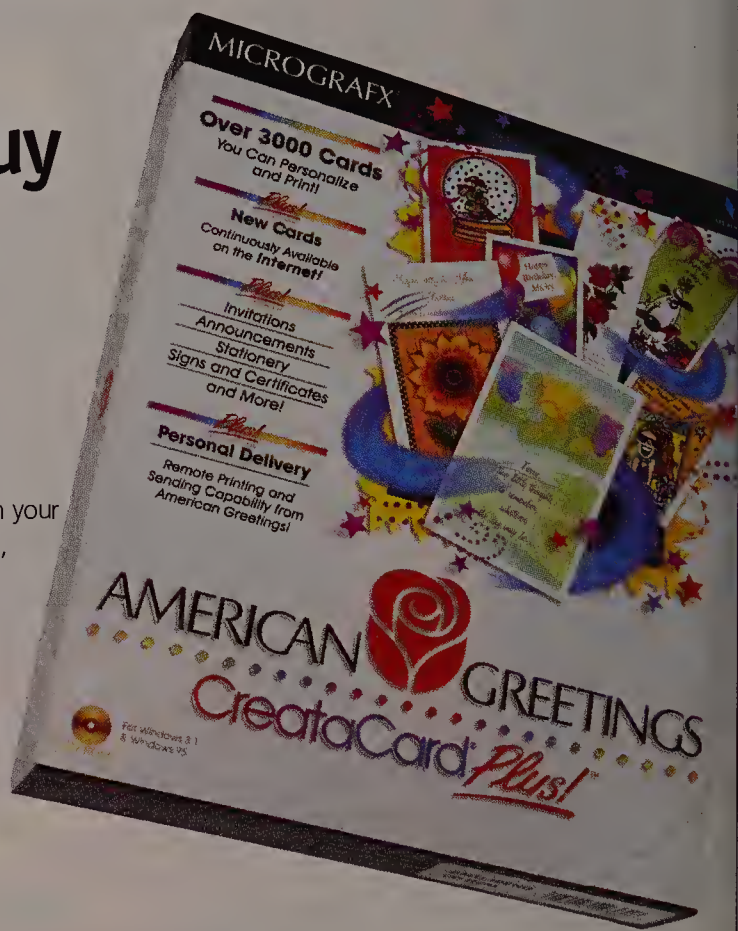

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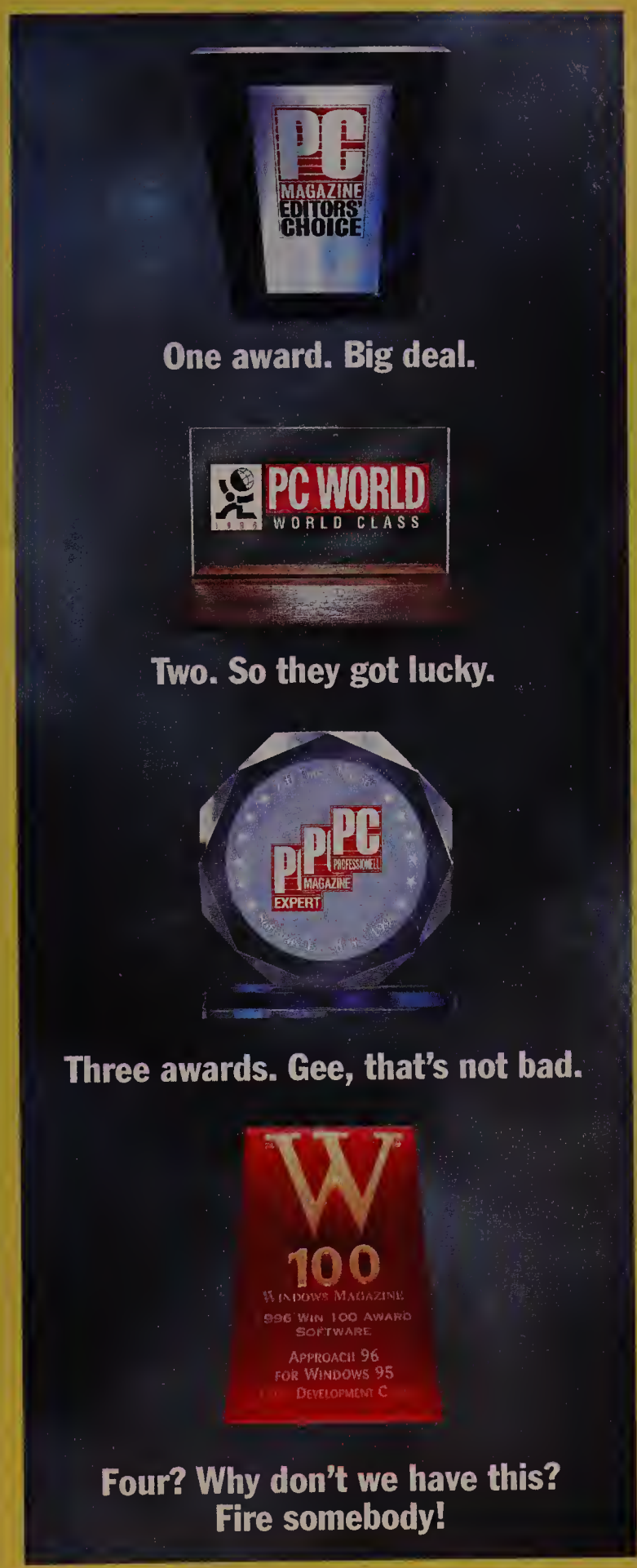

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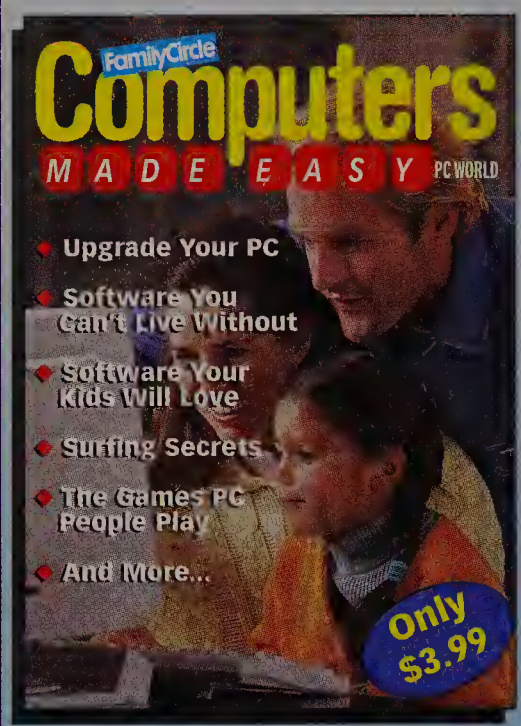

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er than other graphics files, although they do have the drawback that they are limited to 24-bit color, which won't display properly on a system with 256 or fewer colors.

To make this trick work, you'll need the following: Microsoft Plus; a utility that can save bit-mapped images in JPEG format; and a video board and driver capable of displaying colors in the thousands (16-bit) or millions (24- or 32-bit).

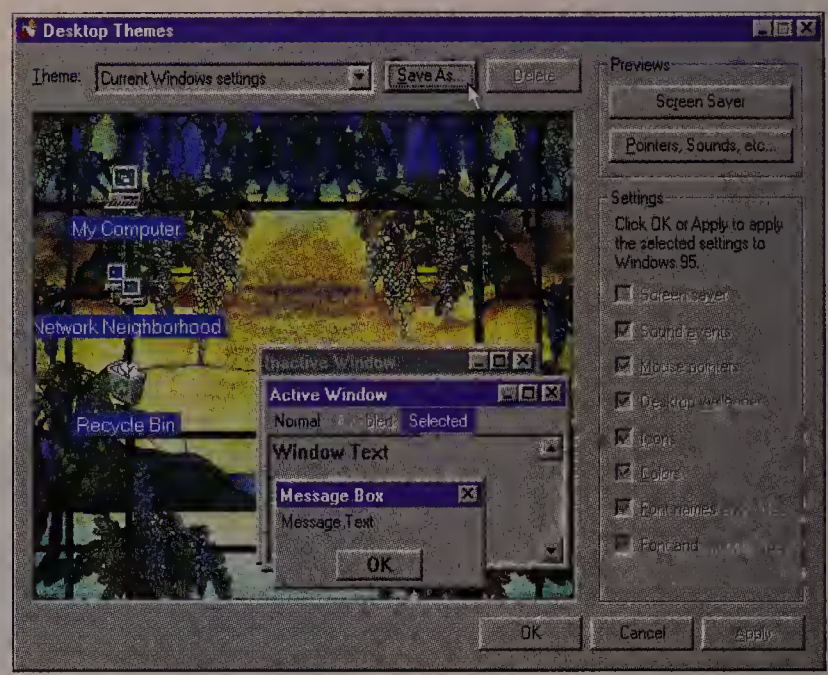

FIGURE 4: MAKE YOUR THEMES COME TRUE with the Desktop Themes control panel in Microsoft Plus.

Here's what you need to do. First, use a graphics utility or application to open your wallpaper files and save them as .jpg files. Any number of low-cost shareware programs, such as PolyView (see *Windows Toolbox*, January), have this capability.

The only way to display a JPEG file on the desktop is by applying a Microsoft Plus theme that uses that file as wallpaper. Therefore, your next step is to create a theme that uses one of your JPEG images, as described in the previous tip. You'll need a different .theme file for each JPEG wallpaper you want to use. (At this stage, don't worry that your new theme doesn't yet include a JPEG wallpaper.)

In Windows Explorer, locate your new desktop theme file in the Themes folder (c:\program files\plus!\themes) and right-click its icon while holding the **<Shift>** key. Choose *Open With* and select *Notepad* in the Open With dialog box. (Do *not* check 'Always use this program to open this type of file'. If you do, you won't be able to open the theme by double-clicking its file in Explorer.) Then click *OK*.

When the theme file opens in Notepad, find the line that begins Wallpaper=. Delete the text to the right of the = sign and replace it with the path to your JPEG file (for example, **c:\program files\plus!\themes\mypic.jpg**). If you think you might copy this theme to another PC, replace the path information with **%ThemeDir%** for files in the Themes folder or **%WinDir%** for files in the Windows folder (for example, **%themedir% mypic.jpg**). (Capitalization is not important.) This ensures that the theme will work even if the other computer has Windows or Plus installed in an unusual folder.

Now save the theme file.

If you don't want to create a customized theme for each JPEG file, just open an existing theme file in Notepad, edit the Wallpaper= line, and choose *File•Save As* to save the theme to a new file name with the .theme extension.

When you're done, exit Notepad, and chose *Start•Settings•Control Panel*. Double-click the *Desktop Themes* icon and select one of your modified themes from the Theme list.

If you only want to change the wallpaper, uncheck all the boxes on the right side of the dialog box except 'Desktop wallpaper'. Then click *OK*. If you want your PC to change themes automatically, see this month's *Windows Toolbox*.

Find files from this article and additional tips at http://www.pcworld.com/hereshow.html. Windows Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Dunn is a principal author of* The PC Bible, *2nd Edition (Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

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Print Your Own Letterhead, Edit Graphics in Word Pro

WORD PROCESSING

BY GEORGE CAMPBELL

IT'S EASY TO CREATE a header in Word 6 for Windows and Word 7 for Windows 95, but creating a header that you want to appear only on the first page of a document—letterhead, for example—isn't as obvious. Any time you need to create such a header, follow this procedure (illustrated in **STEP BY STEP**, below):

1. In a blank document, select *View•Header and Footer.* The screen will change to show the header area of your document, and the Header and Footer toolbar will appear.

2. Click the *Page Setup* icon on the Header and Footer toolbar.

3. In the Page Setup dialog box, click the Layout tab, click *Different First Page* in the Headers and Footers section to mark that option, and then click *OK.*

4. Create and format the text for your header and insert your graphic using normal Word commands. (Hint: After inserting a graphic, click on it, and select *Insert•Frame.* This will allow you to move the graphic and wrap text around it.) Finally, close the Header and Footer toolbar.

5. Since you'll probably want to use this header again, you can easily turn it into a template. Select *File•Save As,* choose *Document Template (*.dot)* in the 'Save as type' list, type a file name in the 'File name' field, and then click *Save.* Your new document template will appear as a choice whenever you select *File•New.*

To return to normal editing mode, you can select *View•Normal* or select *View•Header and Footer* again.

ENHANCING GRAPHICS IN WORD PRO

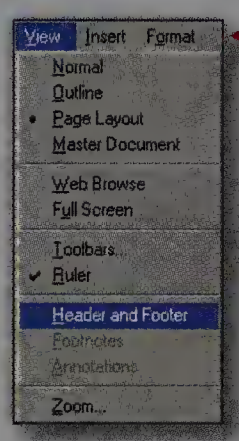
ALL TOO OFTEN, a graphic image that you've imported into a word processing document could stand some improvement. Maybe it has too much contrast, or it's not bright enough, or it's a little fuzzy around the edges.

To fix the graphic, most word processors make you head out to another application like Paintbrush or CorelDraw. But Word Pro includes its own image enhancement tools, and they're as good as the ones in most dedicated drawing packages. They work on any gray-scale or color image, such as those scanned from a photograph, but they don't work on graphics created with Word Pro's own drawing tools.

Word Pro's image enhancement tools are hard to find, since they're not on the main menu, but they're not hard to use. To begin, import the image: Select *File•Import Picture*; then select the file you ▶

STEP BY STEP

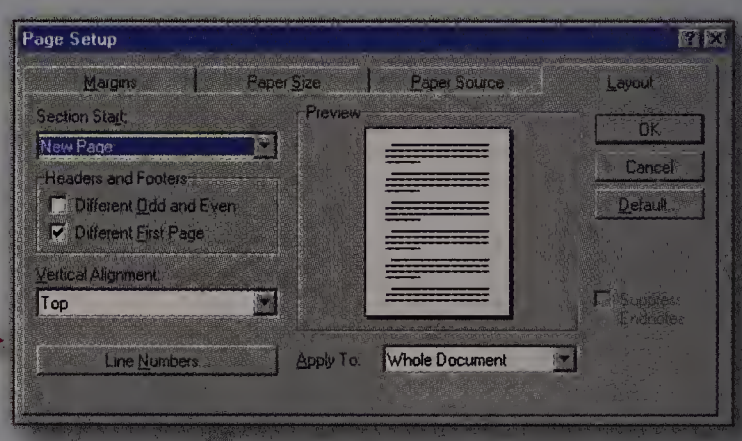
Create a Template for Custom Letterhead in Word 6 and 7



❶ In a new file, select *View•Header and Footer* to display the Header and Footer toolbar.

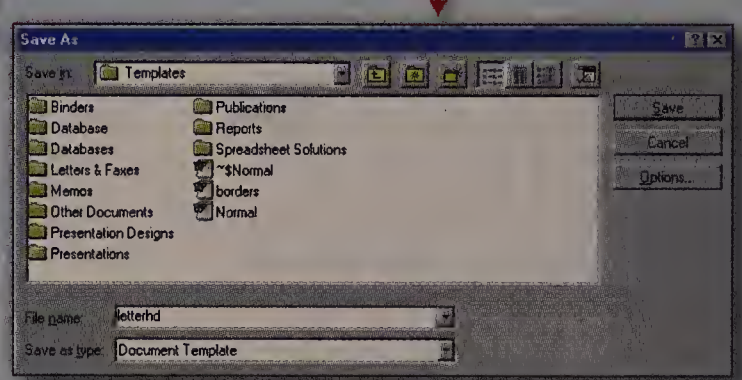
❷ Click the *Page Setup* icon on the Header and Footer toolbar.

❸ Click the *Layout* tab in the Page Setup dialog box, select *Different First Page* in the Headers and Footers section, and then click *OK.*



❹ Design your letterhead with graphics and fonts.

❺ Save the header as a template.



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want to import. Make sure the Link to File check box in the Import Picture dialog box is not marked.

Double-click the image so that the cursor becomes a left hand. Now right-click the image and select *Image Properties* to open the Image Properties dialog box, shown in **FIGURE 1**. Small changes in brightness, contrast, edge enhancement, and smoothing have large results. To see how changing the position of the slider affects the image, click the *Apply* button.

Before changing any of these properties, select the *Auto Contrast* check box, then click *Apply*. This may be all the editing you need to do. To make the image look like a photographic negative, click the *Invert Image* check box, and then click *Apply*. If things get out of hand, click *Revert* to return all settings to their defaults. When you're satisfied, click *OK* to make your changes permanent.

One last tip: Print your document to see how the image looks on paper. The image may not look in print as it does on your monitor. You can return to the Image Properties dialog box at any time to make adjustments.

Contributing Editor George Campbell is a contributor to The PC Bible *(Peachpit Press, 1995, 800/283-9444).*

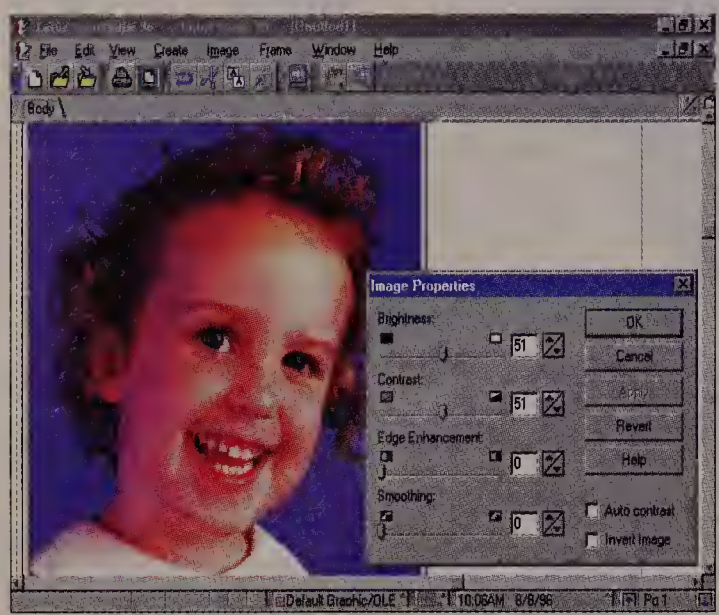

FIGURE 1: WORD PRO'S IMAGE PROPERTIES feature lets you edit an imported graphic without leaving your document.

Nonprinting Characters in Word

WHENEVER I WORK on a document in Word 6.0, the words in my text are separated by a small dot on the screen. The dots don't print, but they're annoying to look at. Is there any way to get rid of those darned dots?

Blaise Russaouen, Montreal, Canada

THOSE DOTS, which represent spaces, are an example of Word's nonprinting characters. Viewing them can help you work on a document, but they can also be annoying.

Fortunately, they're easy to turn off. In Word 6 or 7, select *Tools•Options*, then click the View tab in the Options dialog box. In the Nonprinting Characters frame, click the *Spaces* check box to deselect it and turn off display of those pesky dots.

You can select or deselect other items in this frame as well—Tab Characters, Paragraph Marks, Optional Hyphens, and Hidden Text. I often work with the Paragraph Marks showing, since that makes formatting easier. When you're finished, click *OK* to make your changes the new defaults.

Improve Excel Data Entry, Build Cumulative Totals

SPREADSHEETS

BY RICHARD SCOVILLE

I'M DEVELOPING an Excel worksheet in which a client can record daily sales. The data will end up in a database-style list with dates in the leftmost column. To make data entry more efficient, I need a dialog box that will let the user select the date row where the data should go, and then enter the appropriate value into an edit field in the dialog box. I want the data to appear immediately in the worksheet, but I want the dialog box to remain open for additional data input until the user closes it.

I've tried Excel's built-in data form, but it's too cumbersome. I need something quicker and more flexible. Can you help?

Randall Smith, Gainesville, Florida

YOUR QUESTION GIVES me a chance to show off the power of Excel's custom controls. The trick to keeping a dialog box open as you enter data is to assign a separate macro procedure for each control on the dialog box.

I've put together a small example to illustrate the technique. When you execute the macro, it displays a dialog box that includes a drop-down list of the dates entered in column A of the worksheet. When you select a date, the macro selects the corresponding row in the sheet and, if anything is already there, displays it in the dialog box. As you enter new data into the edit boxes in the dialog box, the additions immediately appear in the worksheet.

The model is illustrated in **STEP BY STEP** on page 320. Here's how to build it:

1. Starting with a blank workbook, enter the labels, dates, and dummy data shown in columns A through C and in cell E2 of the model. Double-click the *Sheet* tab and name the sheet SalesData.

2. Assign a name to cell F2: Select F2, and then select *Insert•Name•Define*. Click *OK* to accept the name SD_CurrentRow in the Names in Workbook field.

3. Create two dynamic names—one to identify the database, and the other to identify the dates in column A. Select *Insert•Name•Define*. In the Names in Workbook field of the resulting dialog box, enter **SD_Database**; in the Refers To field, enter the formula **=offset(SalesData!$A$1,0,0,COUNTA(SalesData!$A:$A),3)**, then click the *Add* button. This name denotes a range that starts at cell A1, is three columns wide, and has as many rows as there are entries in column A. To create the second dynamic range name, enter **SD_Dates** in the Names in Workbook field, and in the Refers To field, enter **=offset(SD_Database,1,0,rows(SD_Database)-1,1)**, and then click *Add* and *Close*. ▶

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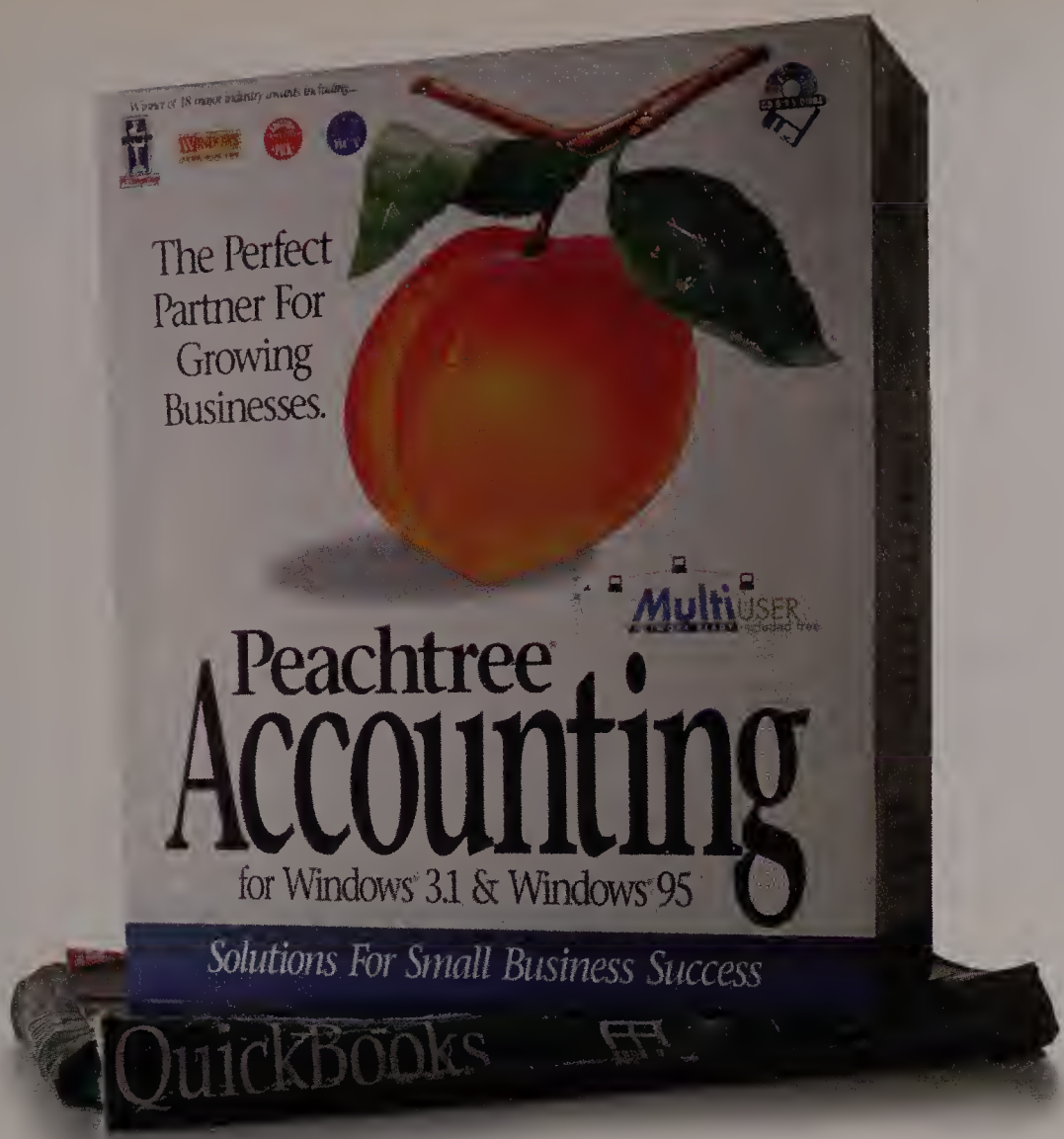

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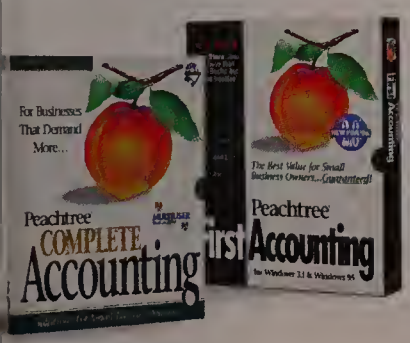

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4. To create the dialog box, select *Insert•Macro•Dialog*. To create the Date edit box, use the Drop-Down tool in the Forms toolbar. To create the Fuel and Oil Sales boxes, use the Edit Box tool. Use the Label tool to create the labels to the left of the edit boxes. To change the label on the *OK* button to *Close*, double-click the button, highlight the label, and type **Close**.

5. Next, assign names to the edit boxes. Click the Fuel Sales box to select it, then click the name box on the formula bar, enter **ebFuelSales**, and press **<Enter>**. Use the same procedure to name the Oil Sales box **ebOilSales**. Name the sheet **SalesEntry**.

6. To create the macro, select *Insert•Macro•Module*, and enter the code shown in Step by Step. The macro includes four procedures: EnterSales() displays the dialog box; GetDate(), PutFuel(), and PutOil() are executed when the user enters data in the dialog box. To enable it, assign each procedure to a dialog box control (step 7).

A B7 @SUM($B$6..B6)

	A	B	C	D	E	F	G
1		Jan	Feb	Mar	Apr	May	Jun
2	Item A	6	9	7	7	4	6
3	Item B	9	5	3	7	7	8
4	Item C	9	9	0	7	6	6
5							
6	Sum	24	23	10	21	17	20
7	Cumulative Sum	24	47	57	78	95	115

FIGURE 2: CALCULATE CUMULATIVE totals by making the first address in the function absolute.

7. In the SalesEntry sheet, select the *Date* drop-down box, select *Tools•Assign Macro*, select *GetDate*, and click *OK*. Repeat the procedure to assign PutFuel to the Fuel Sales box, and PutOil to Oil Sales.

8. Display the dates in the Date drop-down box: Right-click the Date box and choose *Format Object*. Click the *Control* tab. In the Input Range field, enter the name **SD_Dates**; in the Cell Link field, enter **SalesData!$F$2**. Click *OK*.

9. Create a button to launch the macro: In the SalesData sheet, click the button tool on the Drawing toolbar; in the Assign Macro dialog box, select **EnterSales** and click *OK*.

SUM CUMULATIVELY IN ANY SPREADSHEET

SUPPOSE YOU HAVE a worksheet like the one in **FIGURE 2**. You want to generate the series of cumulative sums in row 7. In 1-2-3 and Quattro Pro, enter **@sum($B$6..B6)** in B7 and copy it to range C7..G7. In Excel, **enter =sum ($B$6:B6)**. In this formula, the first cell in the range address is absolute, so it doesn't shift when you copy the formula; the second address is relative, so it changes. As you copy the formula horizontally, each copy sums a progressively bigger range.

Contributing Editor Richard Scoville is a software training consultant based in Chapel Hill, North Carolina. ▶

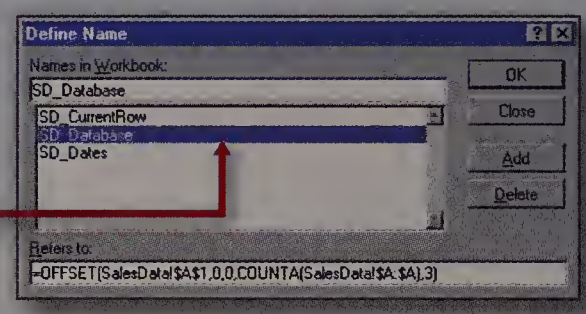
STEP BY STEP

Simplify Data Entry With a Custom Excel Dialog Box

SD_CurrentRow

	A	B	C	D	E	F
1	Date	Fuel Sales	Oil Sales			
2	12/1/96				SD_CurrentRow	
3	12/2/96					
4	12/3/96					
5	12/4/96	123	456			
6	12/5/96					
7	12/6/96	234	567			
8	12/7/96	234	345			

❶ Enter the labels and values in columns A through C and in cell E2.

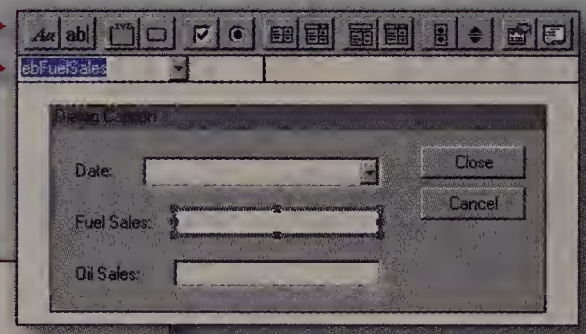


❷ Assign the name **SD_CurrentRow** to cell F2.

❸ Create the dynamic range names **SD_Database** and **SD_Dates**.

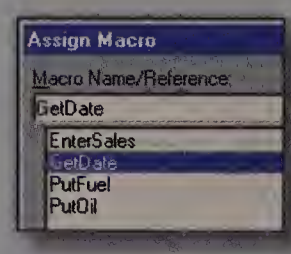
❹ Create the dialog box by selecting *Insert•Macro•Dialog* and using the Drop-Down, Edit Box, and Label tools on the Forms toolbar.

❺ Assign names to the edit boxes by selecting each box and entering its name on the formula bar.

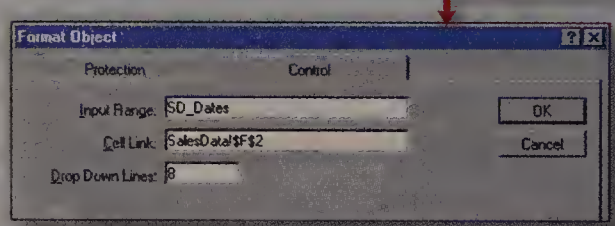


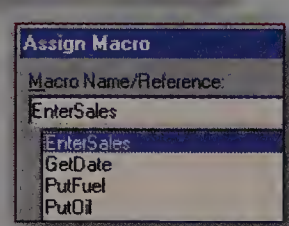

```
Dim ebFuelSales As Object
Dim ebOilSales As Object
Dim rCurrentRow As Range
Sub EnterSales()
    Set ebFuelSales = DialogSheets("SalesEntry"). _
        EditBoxes("ebFuelSales")
    Set ebOilSales = DialogSheets("SalesEntry"). _
        EditBoxes("ebOilSales")
    Call GetDate
    If DialogSheets("SalesEntry").Show <> False Then
    End If
End Sub
Sub GetDate()
    Set rCurrentRow = Range("SD_Database"). _
        Offset(Range("SD_CurrentRow").Value, 0).Resize(1, 3)
    ebFuelSales.Text = rCurrentRow.Cells(1, 2).Text
    ebOilSales.Text = rCurrentRow.Cells(1, 3).Text
    rCurrentRow.Select
End Sub
Sub PutFuel()
    rCurrentRow.Cells(1, 2).Value = Val(ebFuelSales.Text)
End Sub
Sub PutOil()
    rCurrentRow.Cells(1, 3).Value = Val(ebOilSales.Text)
End Sub
```

❻ Select *Insert•Macro•Module* and enter the code shown here.



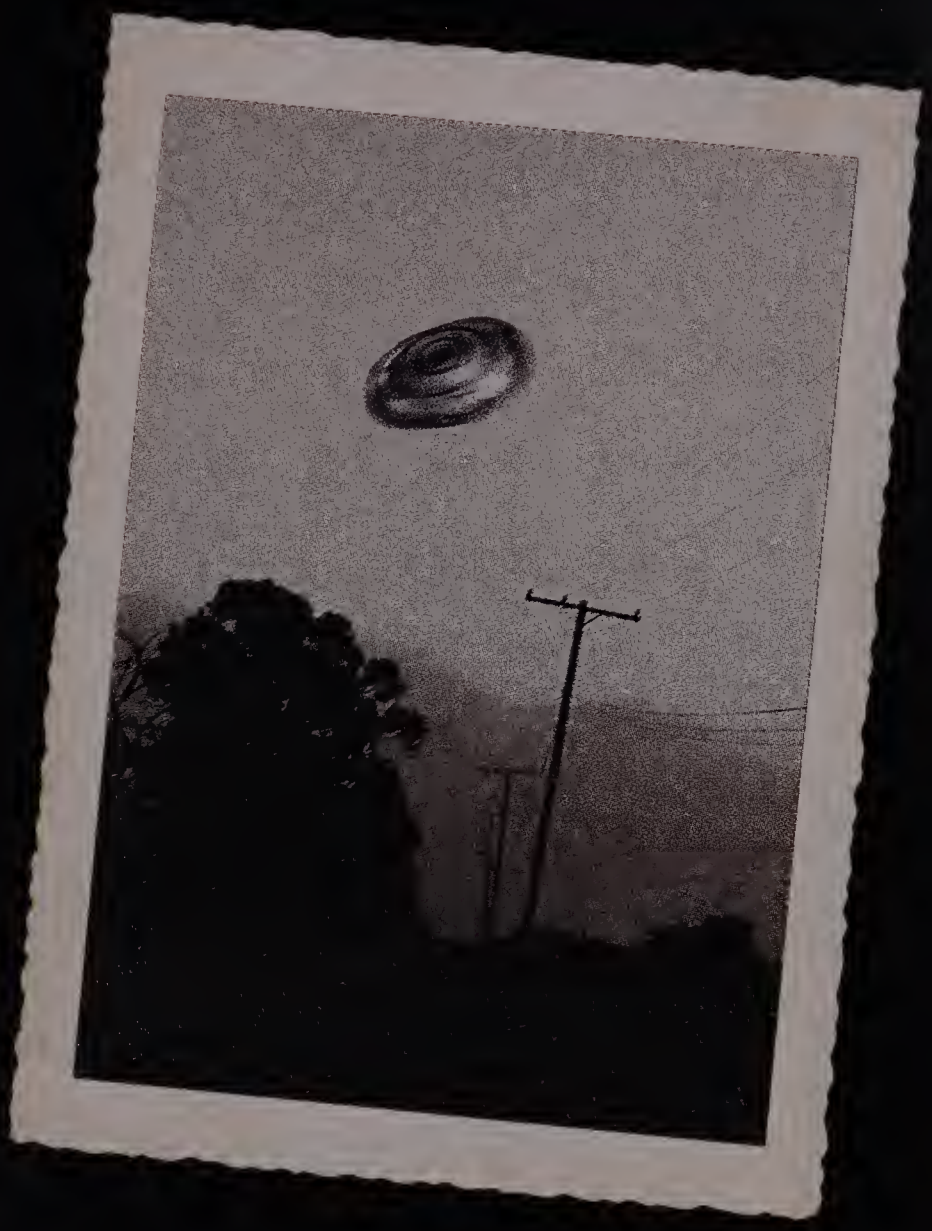
❼ Use the *Tools•Assign* macro command to assign a procedure to each control in the dialog box.





❽ Assign the dates listed in the SD_Dates range to the Date drop-down box.

❾ Assign the EnterSales routine to a button on the SalesData sheet.



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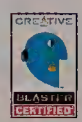

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Assign Expenses to the Right Quicken Categories

QUICKEN

BY RICHARD CRANFORD

QUICKEN ANSWERS that age-old question, "Where does my money go?" If you faithfully record every check you write and every deposit you make to your checking account, and categorize everything that goes out and comes in, Quicken rewards you with nicely organized reports and charts that put everything in perspective.

Here are a few tips that will help you to assign all your expenditures to the right categories and to focus on the details while you're looking at the end product.

LET'S SPLIT!

WRITE A CHECK to the phone company, and that's a check for your telephone expenses. But not every check covers just one expense category. Say your bill from Waldo's Department Store lists two shirts

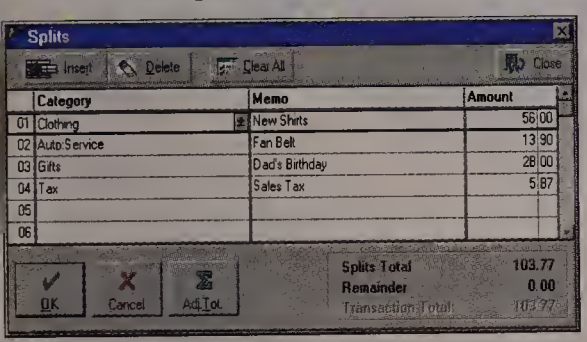

FIGURE 3: THE SPLIT FEATURE lets you divide a check amount into multiple expense categories.

you bought for yourself, a third you bought as a gift, and a fan belt for the car. The purchases sum to $97.90, and a 6 percent sales tax adds $5.87, for a total of $103.77. But that amount goes toward multiple expense categories: clothing, auto-service expenses, gifts, and sales tax.

You don't have to confuse the department store's accountants by writing separate checks. Write just one check, but split its amount among appropriate expense categories. To do this, select *Activities• Write Checks*, enter the name of the payee, and then click the *Splits* button to the right of the check; you'll get a dialog box like the one in **FIGURE 3** (without the data shown).

Click the arrow on the first line under 'Category', and choose a category from the list; or begin typing a category name until the whole name appears in the box. Supply a memo if you wish, and type in the amount you wish to allocate to the first category. Repeat this process with additional categories. When you've entered all the categories, click the *Adj. Tot.* button. The Splits Total should exactly match the amount of the bill. If it doesn't, recheck your entries and make corrections as needed; then click *Adj. Tot.* again. When everything checks out, click *OK* and then *Record*. When you next produce a graph or report, the amount you send to the department store will be apportioned to the desired categories.

SHARE THE WEALTH– YOU HAVE TO, ANYWAY

YOU CAN ALSO USE the Split feature to account for amounts taken out of your paycheck for taxes, social security, and your 401(k) plan.

When you record your paycheck deposit in the checkbook register, click in the Payee field and type the letters of the Payee in Paycheck until Quicken finishes typing the word. Then hit **<Tab>** twice to get to the 'Deposit' column. Click *Splits* and fill in the resulting dialog box from your paycheck stub, as in **FIGURE 4**. Be sure to enter the gross pay (not the net) as a positive and the deductions as negatives.

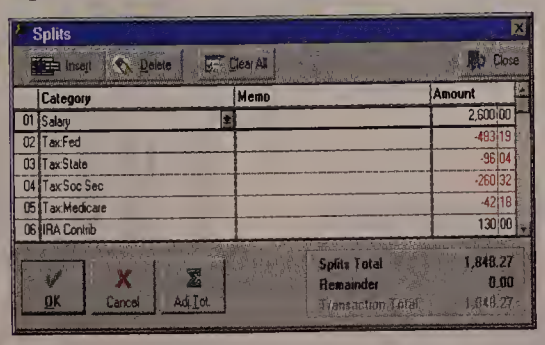

FIGURE 4: ACCOUNT FOR PAYCHECK DEDUCTIONS with the Split feature.

Click *Adj. Tot.* when you've finished. The Splits Total should match the amount on your paycheck (or the amount deposited to your account). Click *OK* and then *Record* to credit the total amount to the register, and note all the deductions.

GET THE NUMBERS BEHIND A GRAPH

TO FIND THE NUMBERS that produce a bar or pie chart, hold the cursor over each of the bars or pie wedges, and then press and hold down the left mouse button. In **FIGURE 5**, you can see that the blue pie wedge for Housing represents expenses

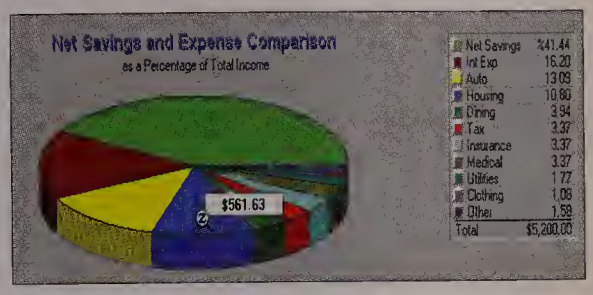

FIGURE 5: VIEW THE AMOUNT A PIE WEDGE REPRESENTS by pressing and holding the left mouse button over that wedge.

of $561.63. To see the breakdown of individual amounts paid toward an expense category, double-click the pie wedge to display a bar chart for that category. When you double-click the bar on the chart, you'll see a listing of payments made in that category, as shown in **FIGURE 6**. To return to the graph, press **<Esc>** twice.

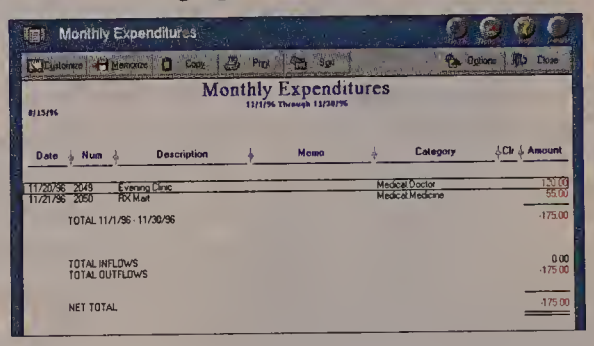

FIGURE 6: FOR EVEN MORE DETAIL on the numbers behind a graph, double-click a pie wedge and then double-click the resulting bar chart.

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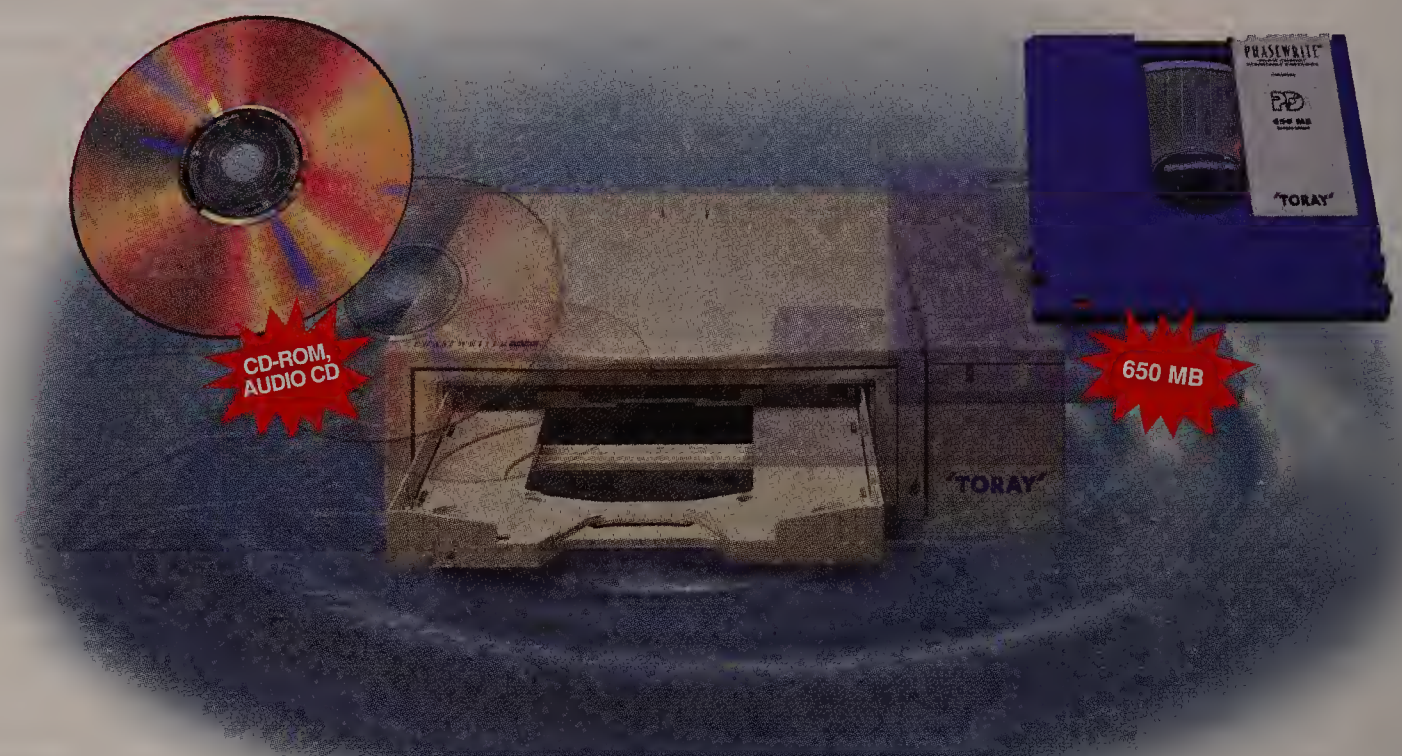

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Net after $50 mail-in rebate. Three 650MB PD media included. External unit $499. Offer expires 12-31-96.

BREAK THROUGH

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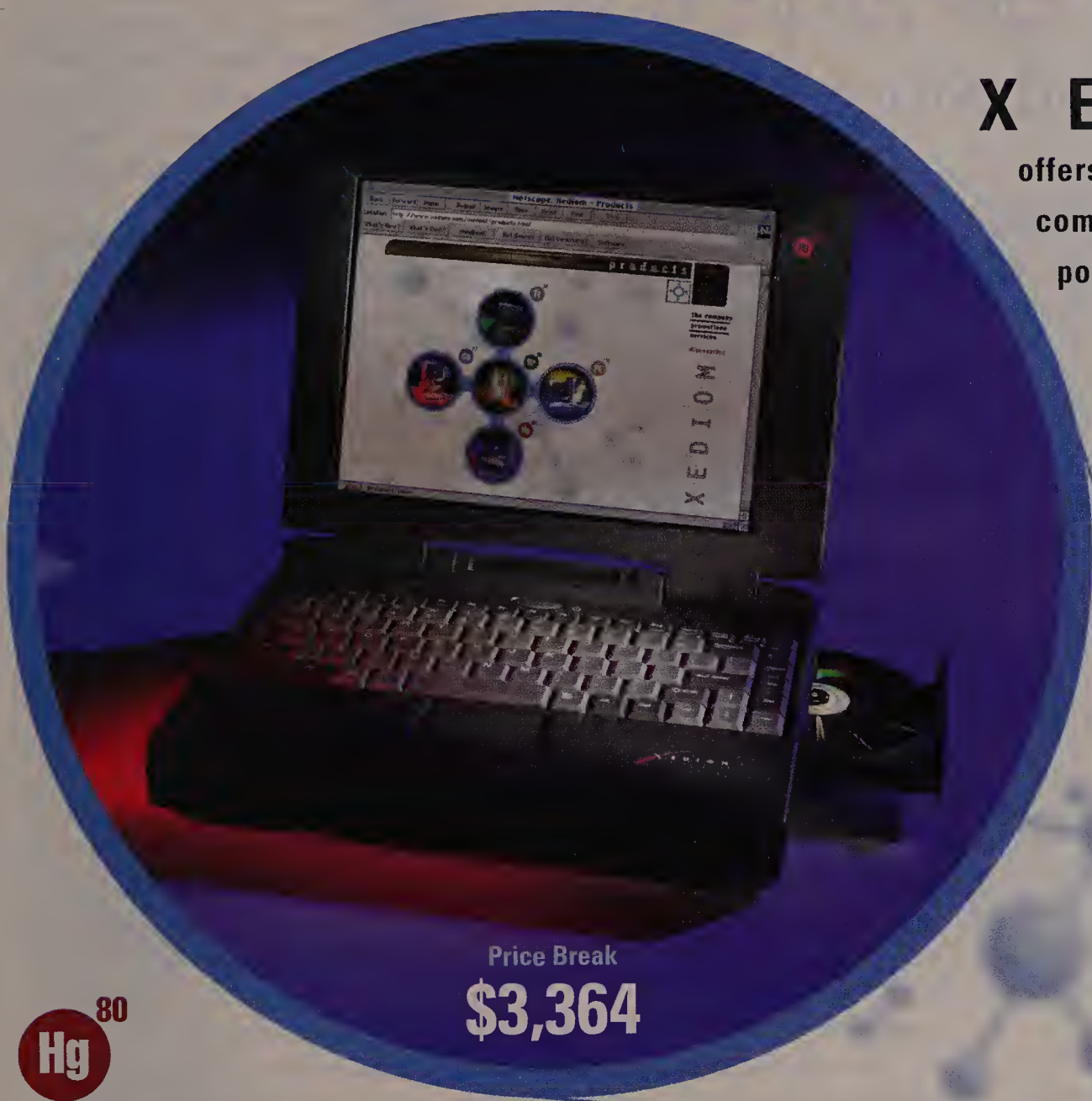

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Circle 221 on reader service card

Get Your Kids on Rt. 6-16, Download Stock Quotes

MICROSYSTEMS SOFTWARE'S Route 6-16 (http://www.microsys.com/616/default.htm) offers links to 3000 of the best Internet sites for kids, parents, and teachers (see **FIGURE 1**). The company screens those sites every 60 days to ensure that they're safe for kids aged 6 to 16.

While you're there, you can download a demo copy of Cyber Patrol, the top software for controlling kids' access to the Internet. Cyber Patrol works with all 16- and 32-bit Web browsers, including those used by America Online, CompuServe, and Prodigy.

GATHER STOCK PRICES AUTOMATICALLY

NOT TOO LONG AGO, you needed a special service and even special gear like a satellite link to capture stock quotes on your PC. Now it's easy to download 15- to 20-minute delayed quotes off the Net. (For true real-time information you still need a special service.)

A myriad of shareware and freeware utilities automate the process. They tap into an Internet quote site, download the quotes, and even chart them for you. Note: All these programs come set up to download from certain sites, but you can try downloading stock quotes from the following sites: Money Magazine (http://quote.pathfinder.com/money/quote/qc), PC Quotes (http://www.pcquote.com/watch2.html), or Security APL (http://www.secapl.com/cgi-bin/qs).

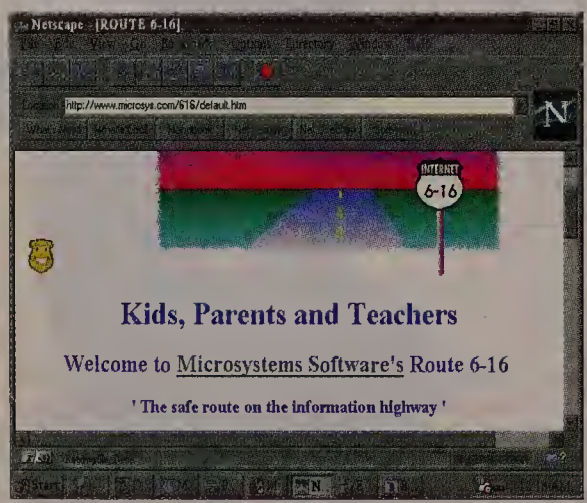


FIGURE 1: FIND LINKS TO HOMEWORK AND GAME sites on Microsystems Software's page.

Netquotes is a $15 shareware program that downloads the day's highs, lows, volumes traded, and other data for stocks you specify (see **FIGURE 2**). It works with Win 95 and 3.1 and can be found at Netquotes' page (http://ourworld.compuserve.com/homepages/sejohnson/). It's also available on PC World Online as netq13.exe.

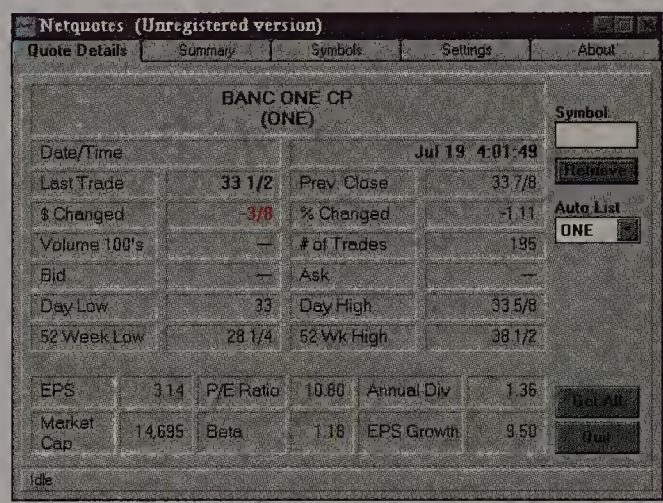
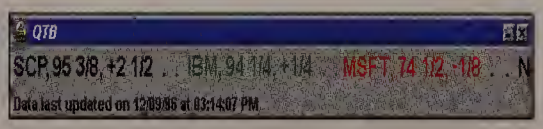


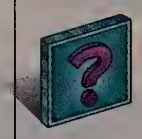
FIGURE 2: NETQUOTES DOWNLOADS STOCK DATA from the Net. Set it to update prices automatically throughout the day.

WinStock for Windows, a $20 shareware program, exports quotes to Quicken. You'll find it on WinStock's page (http://www.teleport.com/~magoldsm/winstock), or on PC World Online: winst16.zip (Windows 3.1) and winst32.zip (Windows 95).

If you want stock quotes to scroll across the top of your screen in ticker tape fashion, as below, download the $35 Quote Ticker Bar for Windows 3.1 or Windows 95 from Starfire Software (http://www.connix.com/~randy/products.html). You can also download the shareware from PC World Online: Look for qtb21.zip (Windows 3.1) and qtb.zip (Windows 95).



HTML VALIDATORS HELP CUT WEB PAGE BABBLE



I CREATED A WEB PAGE for my church by using Internet Assistant for Word. When I used Microsoft's Internet Explorer to check my links, everything looked great. But when I viewed the page with Netscape Navigator, it didn't look the same. What's up?

John A. Williams, Edmond, Oklahoma

WHAT'S UP IS THAT Microsoft and Netscape have slightly different ideas of how Web pages should be coded, so Netscape's Navigator can't perfectly translate a page written for Microsoft's Internet Explorer, and vice versa. Are you surprised?

There are three ways you can cut through the babble.

◆ Optimize your pages for viewing with Microsoft's Internet Explorer, and say "To hell with the rest of the world."

◆ Use Netscape Navigator extensions to HTML 2.0 to make your pages sparkle when viewed with Navigator, and delete all messages of complaint from people who use other browsers. You can find these extensions on the Netscape Extension to HTML 2.0 page (http://home.netscape.com/assist/net_sites/html_extensions.html).

◆ Code your pages with the least common denominator, the bare-bones HTML 2.0 standard, so that your site looks the same in most browsers.

We have a running debate in our household over this. "My Web pages are HTML 2.0 compliant," my husband, the purist, likes to sniff. "Yeah, but you can't wrap text around graphics in stylish fashion the way I can," I counter, defending my Navigator extensions.

One thing we do agree on is that Web page validators are a great way to find out which lines of code in your Web pages are most likely to make things look screwy to some of your audience.

Head to the WebTechs HTML Validation Service page (http://www.webtechs.com/html-val-svc/) and type your Web page's URL into the page's form. WebTechs will head to your page, take a look at its source code, and tell you which lines don't comply with the HTML 2.0 standard—or which lines simply aren't well

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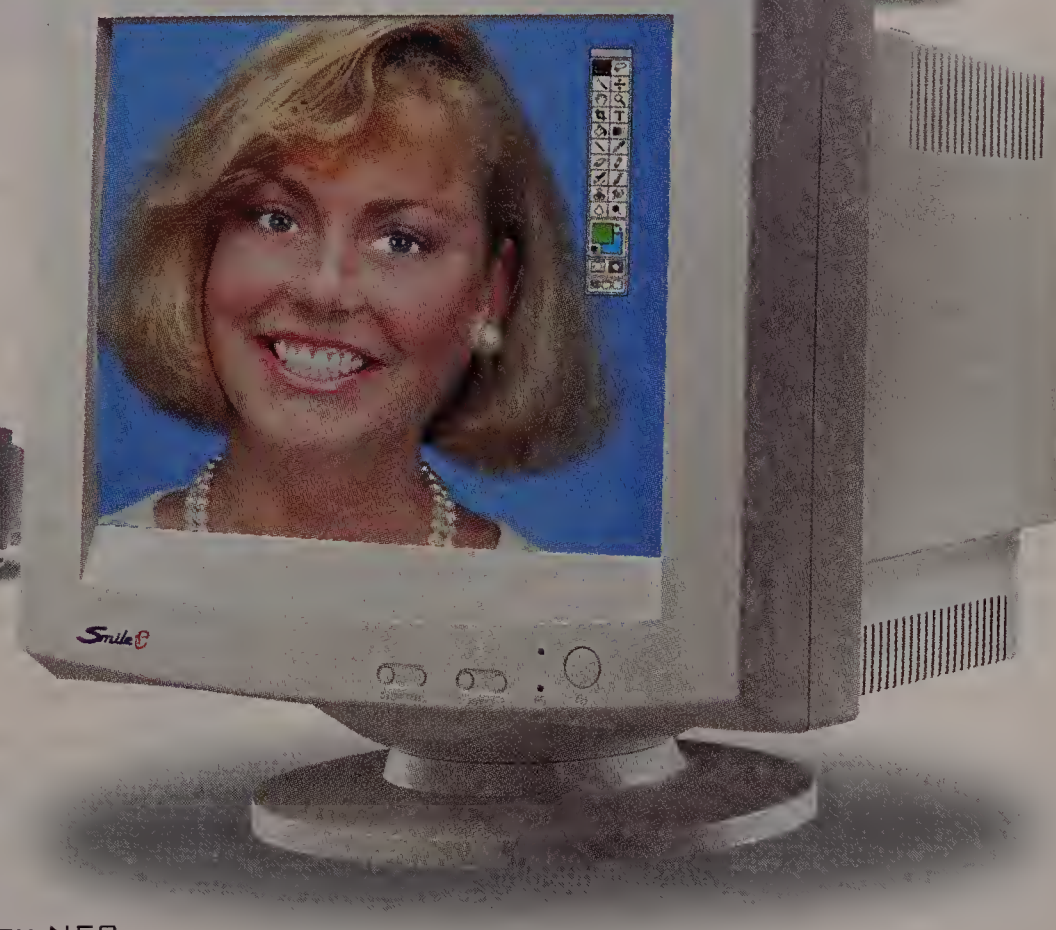
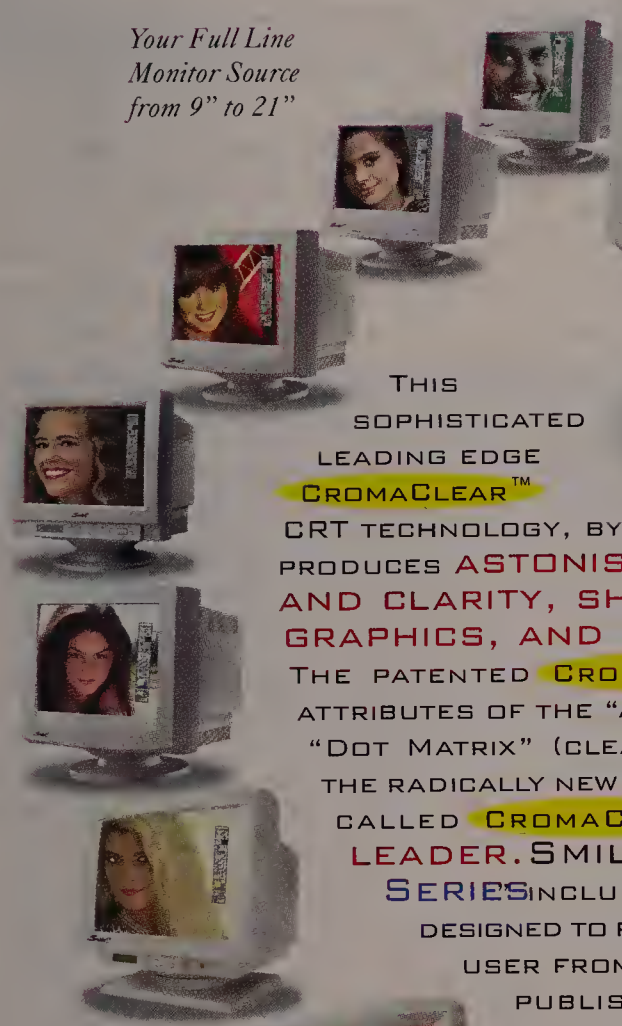
WITH A *CROMACLEAR*™ SMILE



Your Full Line Monitor Source from 9" to 21"



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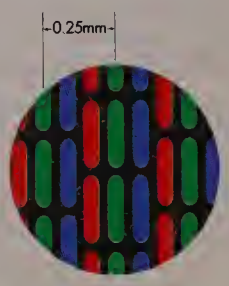

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Circle 206 on reader service card

written and are likely to cause trouble for certain browsers.

The WebTechs page also gives you an icon that you can download and add to any page that passes the validation test. Whenever you update the page, just click the icon, and WebTechs will tell you if the page is HTML 2.0 compliant.

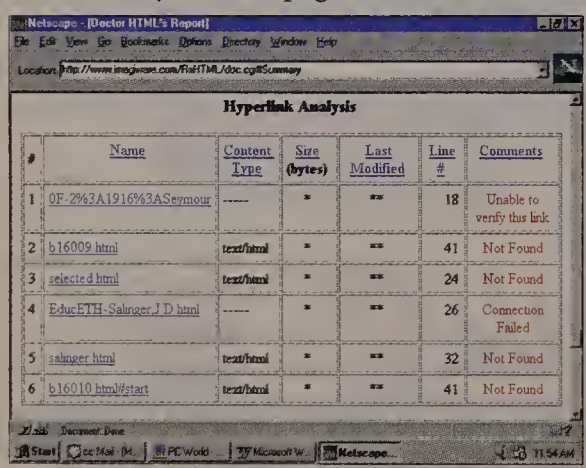
A Kinder, Gentler Validator (http://ugweb.cs.ualberta.ca/~gerald/validate/) is another good stop on the Web. It's similar to the WebTechs validator except that its error messages are easier to understand. For background, you should also read what's on the Why Validate Your HTML page (http://www.earth.com/bad-style/why-validate.html).

These Web page validators won't turn up every error or violation of HTML 2.0 on your pages. For true Webophiles, parsing programs, which check the syntax of your HTML commands, offer a more comprehensive solution. But validators are sufficient for the weekend Web coder. And using them is better than waiting for all the complaints about your odd-looking page to roll in. If you're a business on the Web, it's darn embarrassing when your page doesn't come up correctly in different browsers.

EASY WAYS TO CHECK YOUR WEB PAGE LINKS

KEEPING ALL THOSE LINKS on your Web page up-to-date can be a chore. But there are ways to automate at least part of the process.

Head to Doctor HTML (http://www.imagiware.com/RxHTML/). Type in your Web site's URL, and Doctor HTML will head to your Web page and test its links to see which are still active. The program will also check the spelling and HTML syntax of your page and analyze all document, form, and table structures (see **FIGURE 3**). It discovered 39 potential spelling errors and 34 document structure problems on my Web pages—ouch!



#	Name	Content Type	Size (bytes)	Last Modified	Line #	Comments
1	0F-2%3A1916%3ASeymour	-----	*	**	18	Unable to verify this link
2	b16009.html	text/html	*	**	41	Not Found
3	selected.html	text/html	*	**	24	Not Found
4	EducETH-Salinger,J.D.html	-----	*	**	26	Connection Failed
5	salinger.html	text/html	*	**	32	Not Found
6	b16010.html#start	text/html	*	**	41	Not Found

FIGURE 3: DIAGNOSE YOUR WEB PAGE ILLS by calling on Doctor HTML.

Doctor HTML will even tell you how to optimize the images embedded on your page so they can be downloaded faster. But as thorough as the program is, it won't uncover all the dead links on your page. That's why it's a good idea to download a perl script—perl is a popular language for writing external programs for the Web—if your Internet service provider lets you run these programs.

Testlink is a good choice: It's distributed as part of a script library for Web developers at the University of California (http://www.ics.uci.edu/WebSoft/libwww-perl/). You can also find it on PC World Online: Look for a file named testlin.txt.

Upload Testlink to the directory on your Internet service provider's server where your Web page is stored. To run Testlink, go to that directory and type the following command:

testlink inputdoc.html > outputdoc.html

For instance, to check the links in a Web page with the URL http://www.me.com/mypage.html and send Testlink's results to a file called 'results', you'd type the following command:

testlink http://www.me.com/mypage.html > results.html

Once Testlink is finished checking the links, access the results page (http://www.me.com/results.html, or whatever you've named it) to see which links are working and which are not.

You can take this one step further and automate the procedure, setting up Testlink to run, say, once a week. But to do so you'll need to talk to your Internet service provider for instructions and for permission to use a UNIX utility called Cron—something system administrators are loath to let customers access because it can be used to send mail bombs.

Learn HTML Tricks at the Tao of HTML

VISIT KRISH MENON'S PAGE, Tao of HTML (http://www.taoh.com/index.htm), for newbie tutorials and enlightening discussions on the art of Web page coding.

BIG BROTHER HITS THE ONLINE MALLS

THINK THAT ONLINE SHOPPING is a private affair, that only you and your computer know that you spend a half hour at work each day sifting through the cubic zirconia jewelry database? Hah!

The Web stores you tap into probably know more about you than a telemarketer. They know what images you click, what keywords you type to search their catalogs, what Web pages you linger on, and your organization and domain name.

A Web store doesn't need to be the size of J.C. Penney to gather this information. Many ISPs provide their business subscribers with monthly printouts of customer activity on Web sites. "I feel like Big Brother seeing which images my customers are clicking on," one Web store owner muses. "I can also see that most of my customers are tapping in during the day from government offices or companies. It's a lot of fun!"

Find files from this article and more tips at http://www.pcworld.com/hereshow.html. Internet Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Judy Heim is the author of* Internet for Cats *(No Starch Press, 1995, 800/420-7240).* *See page 14 for contact information.* ■

While you're sitting there, something is happening in the world. It's called "the news." With PointCast, the Internet news network, you can get it broadcast straight to your desktop: weather updates, world news, sports, stocks, industry news and more. And suddenly your computer screen is transformed into a dynamic, multi-colored newswire complete with flying headlines, vibrant graphics and scrolling stock ticker. PointCast is completely customizable so you can get exactly the news you want. CNET awarded it the Best Internet Application of 1996 and *The Wall Street Journal* gives PointCast "'must-have' status for in-the-know computer owners." You can find PointCast at your local retailer or download it free at www.pointcast.com.

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Run Win 95 on a New Drive, Avoid Graphics Overload

WITH DISK PRICES approaching a dime a megabyte, upgrading your PC for greater storage capacity makes more sense than ever. But an upgrade can also make Windows 95 run faster. Since Windows 95 churns your disk no matter what you do, a new drive with a low access time (say 9 milliseconds or fewer) can make your system considerably more responsive.

The basic rule for buying a new drive is to get one that's bigger than you think you need, works with the adapter you have (or want), and sells for the best price. The latest drives turn in nearly identical performance whether they use SCSI or EIDE.

A disk upgrade can be as easy as artificial respiration—out with the bad, in with the good. But often it's a lot more complicated. There are two common troublemakers.

Rebuilding Windows: Most people want to simply move files from their old drive to the new drive.

The tedious way to duplicate your old hard disk is to back up the old drive and restore its files to your new one. A quicker strategy is to install your new drive temporarily as a slave (in an EIDE system) or as SCSI ID 1 (in a SCSI system), **xcopy** all your files from the old to the new drive, and then reconfigure the new drive as the EIDE master or SCSI ID 0.

Windows 95 won't let you do that, however. The operating system doesn't let you copy its vital parts (such as the Registry). Try duplicating your old disk and booting your PC from it, and your system will likely stare blankly at you for hours. The official Microsoft method of moving Windows 95 to a new disk or system is to reinstall the entire operating system and all your programs. This process ensures that Windows will be properly configured for its new environment.

Microsoft views the extra work as a form of copy protection. You'll see it as a form of idiocy. The best strategy is to meet Microsoft halfway: Go ahead and duplicate your disk; then reinstall Windows.

Matching Drives: The next most nagging complication occurs when you want your old drive to function with your new one. Will the two cooperate? It depends on your drive interface and the age of the drives.

Will your old IDE drive work with a new EIDE system? Depends on how old it is. An ancient drive may have problems, but any drive old enough to be ornery is small enough to discard—typically 40MB to 80MB. IDE drives work with EIDE adapters, and EIDE drives work with IDE adapters, though only at IDE speeds in either case. You'll be happiest if you make your old drive a backup (configured as the slave) and use the new drive (configured as the master) to boot your system and load your programs.

Working with SCSI drives involves much the same procedure. You can plug a SCSI-2 or UltraSCSI drive into any modern SCSI adapter, though performance may be constrained by the older standard. Wide SCSI drives require a new cable and connection.

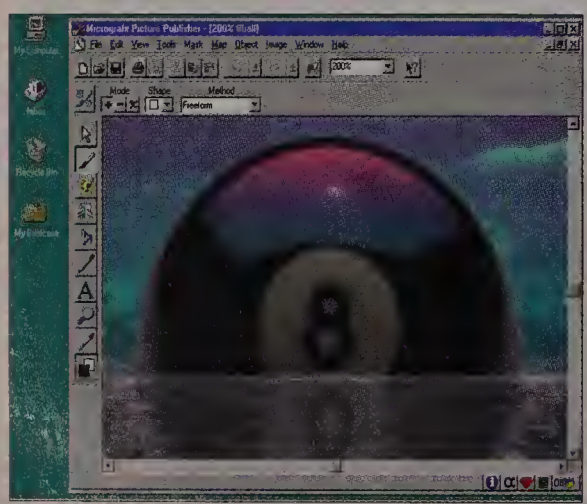
To make your new SCSI drive the boot drive, set its SCSI ID to 0. Switch your old drive to 1. Leave your old drive at the end of the SCSI cable, and plug your new drive into the connector in the middle. To terminate the system properly, remove the termination from the new drive.

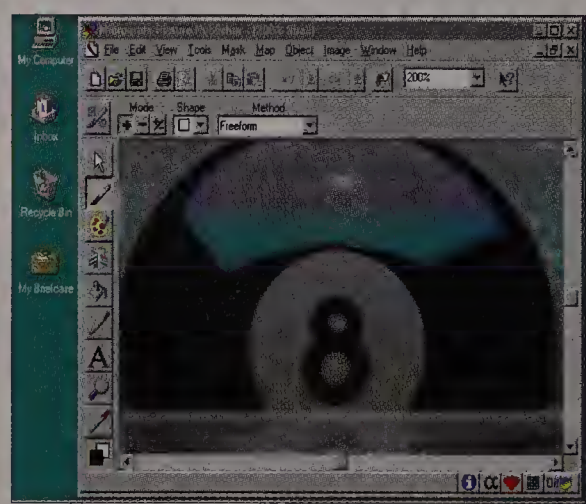
PUT YOUR VIDEO ON A DIET

YOU OPT FOR a top-of-the-line graphics board with a 128-bit PCI-based accelerator and 4MB of high-speed video memory. You install it, stress your monitor to its resolution limit, and paint the screen with realistic 24-bit True Color images. Looks great—but it runs slower than the old board. How come?

Simple: The more pixels and colors you want, the harder your video board and microprocessor have to work.

If you're not editing photographic images, sliding down to 16 bit (65,536 colors) or even 8 bit (256 colors) will boost your system's speed noticeably without requiring any change in graphics boards. Pushing resolution to a reasonable limit (no more than 1024 by 768 on a 15-inch screen) can also boost performance. To make these changes, in Control Panel, double-click *Display*, click the *Settings* tab, and make the adjustments. You may have to reboot for them to take effect, unless you just bought a PC with the latest version of Windows 95. The latest boards do speed up your system at all resolutions, but moving up in quality may set you back in performance.





PRETTY AS A PICTURE—AND ABOUT AS STATIC? To boost performance, avoid high-resolution screens with 24-bit color (left) when lower resolutions and 8-bit color (right) will do the job.

Find additional tips on buying and installing hardware at http://www.pcworld.com/hereshow/. Hardware *welcomes your questions and tips and pays $50 for published items. Winn L. Rosch is author of the* Winn L. Rosch Hardware Bible *(Sams Publishing, 1994, 800/545-5914). See page 14 for contact information.* ■

This holiday give someone Back-UPS® Office™ and they'll thank you 120 times a month

ake the Multipath™ Quiz for a chance to win a $2,000 Shopping Spree

The holiday season is a happy time, unless the overload of flashing lights or a starting furnace causes a er sag. Then your computer pays rice for holiday cheer. A recent y by IBM showed that the typical puter experiences power problems times a month. In fact, corrupt er is the largest single cause of com- r data loss and hardware damage.

ack-UPS Office provides reli- power for your entire system. antaneous battery backup ires uninterrupted operation of r CPU, monitor and an external age device. Full-time surge sup- sion and site-wiring fault pro- on spreads a true Multipath™ ty net under any remaining grated peripherals, like lems, printers, fax machines phone systems. Back-UPS ce also provides convenient kSafe™ outlet spacing to handle ize plugs – even large trans- ner blocks.

que Multipath protection ps your PC and data safe

lugging a phone line into your computer doubles your erability to power problems; add any peripheral, and ples. Even if your AC power-line is shielded, when a e hits an unprotected peripheral, it can blaze down seri- nd data lines, and toast your expensive PC.

k-UPS Office protects your entire system

Until now, protection for your entire system required several devices. But multi- ce protection can leave you vulnerable to line noise and unwanted data glitches ted by the voltage differential between outlets. Those glitches are prevented with Back-UPS Office common voltage reference.

ack-UPS Office means true tipath™ protection, clean, safe er to every peripheral, and nt battery backup to keep r cutting edge system and O/S crashing. It means protec- for less by integrating the rity of a surge suppressor the power of a 250 VA UPS, anteed up to $25,000 (see cy for details).

LIFETIME EQUIPMENT PROTECTION

$25,000

FOR AS LONG AS YOU OWN THIS PRODUCT, IF YOUR PROPERLY CONNECTED EQUIPMENT IS EVER DAMAGED BY AN AC SURGE, INCLUDING SURGES DUE TO LIGHTNING, APC WILL REPAIR OR REPLACE OUR PRODUCT AND UP TO $25,000 OF CONNECTED EQUIPMENT (SEE POLICY FOR DETAILS, VALID IN U.S. AND CANADA ONLY).

NEC's Ready Office delivers unmatched reliability and low costs of ownership with a best-in-class combination of CPU performance and data storage. And right now every unit comes with "the world's most reliable power protection." APC's award-winning Multipath Back-UPS Office. That means Ready Office is the worlds most reliable computer – right out of the box. To learn more about the NEC Ready Office product line featuring unique Ready-Safe features, please call: 1-800-NEC-INFO (800-632-4636) or visit the NEC Web site at: www.nec.com

APC Multipath Quiz Rules:
Follow the instructions on the reply card for a chance to win a shopping spree at a participating store (listed below).

Prizes:

First:	**$2,000**
Second:	**$1,000**
Third:	**$500**

Complete the quiz at www.apcc.com and be entered in a second drawing for a free t-shirt! All entries must be received by 12/01/96. Drawing to be held 12/15/96.

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WIN A $2,000 SHOPPING SPREE!

Answer the quiz questions correctly (Hint: Answers are in the ad), fill out the information below completely and send to APC or enter from our PowerPage™ on the Web, for a chance to win a $2,000 Shopping Spree. We'll send you a Free 60 page Power Protection Handbook just for trying.

1. Multipath power protection means surge suppression on...
   ☐ Dataline ☐ Computer AC ☐ Peripheral AC ☐ All of the above
2. APC will repair or replace any equipment properly attached to a Back-UPS Office up to...
   ☐ $1,000 ☐ $5,000 ☐ $25,000
3. If I plug my external modem into a surge suppressor and the dataline into the wall, my computer is safe from power problems. ☐ True ☐ False
4. My transformer block plugs will fit Back-UPS Office without covering an extra outlet
   ☐ True ☐ False

Name: _____ Title: _____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____ Country: _____

Phone: _____ Fax: _____

E-Mail: _____

Is this your first contact with APC? ☐ Yes ☐ No I am an ☐ End User ☐ Reseller

# of workstations on site/sold per month: _____ Brand of UPS currently used/sold: _____

PC MAGAZINE

"...for any PC today--especially if you run your business on it — [a UPS] is an indispensable peripheral." — PC MAGAZINE

APC has won more awards for reliability than all other UPS vendors combined.

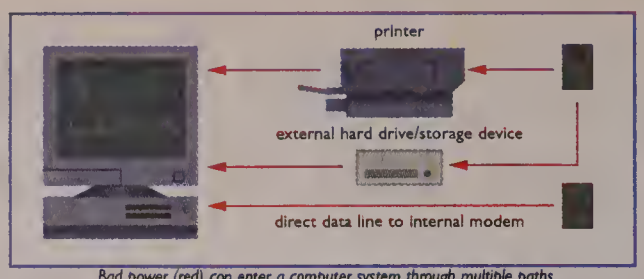
LAN TIMES READERS' CHOICE 1996

Circle 45 on reader service card

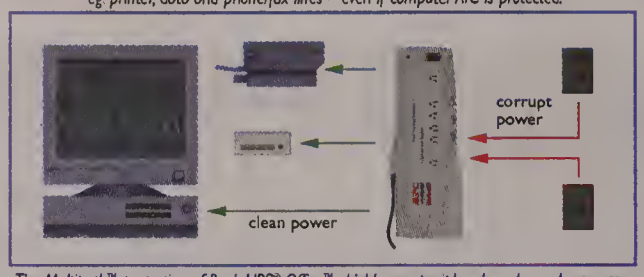
customers insist "Protect ME! with APC".

Steve Richbourg
Senior Power Quality Engineer
Gulf Power Company

"I just got my first Back-UPS Office. I've purchased seven since because people keep stopping by my desk and saying they want it! Recommending power protection is what I do for a living, and I've never had an upset customer in more than four years recommending APC."



Bad power (red) can enter a computer system through multiple paths eg. printer, data and phone/fax lines – even if computer A/C is protected.



The Multipath™ protection of Back-UPS® Office™ shields your peripherals and guards your computer from bad power on every path, providing clean, safe power (green), to your entire system.

Back-UPS Office award-winning features:

Integrates the Security of a Surge Suppressor with the Power of a UPS
Six outlets guard your hardware with full-time surge protection. Three of the six outlets provide instantaneous battery backup to keep your system from crashing in the event of brownout or blackout.

Internet Ready Fax/ Modem Protection
Back-UPS Office's built-in phone line/10 Base-T network cable surge protection prevents surges from damaging internal & external modems, motherboards, 10 Base-T lines, input/output cards, and other system components.

Convenient BlockSafe™ Outlet Spacing
Back-UPS Office's outlets are spaced to accommodate all size plugs, including large transformer blocks.

Master On/Off Switch
One switch conveniently controls power to entire connected system.

Electrical Wiring Fault Indicator Saves Trouble and Expense
Without a proper ground, most surge protection is useless. Back-UPS Office alerts you to wiring problems such as a missing ground and reversed polarity, two common miswirings which otherwise would require an electrician's visit to diagnose.

Circuit Breaker
Provides protection in the event of an overload or short circuit; no fuse, no hassle.

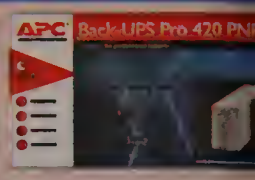
Check Battery Warning Prevents Downtime Before it Occurs
An LED signals when Back-UPS Office's internal self test finds the battery near the end of its life, giving you 6-8 weeks warning.

$25,000 Equipment Protection Policy
If your properly connected equipment is ever damaged by an AC surge, including surges due to lightning, APC will repair or replace our product and up to $25,000 of connected equipment for as long as you own your Back-UPS Office. (See policy for details.)

User Replaceable Batteries
Back-UPS Office has user replaceable batteries that can be be easily swapped out, saving time and expense: no need to return the UPS to the factory for service. Batteries last 3-6 years under normal usage.

2 Year Warranty
Unmatched reliability means you can purchase all APC products with confidence.

Choose the Right APC Protectio

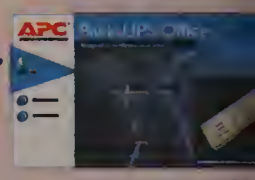


- For **advanced PC protection,** including automatic voltage regulation, CellGuard battery management and phone line/10BaseT protection, choose the Back-UPS Pro. For longer runtime choose a higher VA rating.

Back-UPS PRO Advanced PC Protectio

For Pentium, 486, Win 95, and Business Applications

Volt-Amp Rating	List Price	Runtime*
280PNP	$199	6 min.
420PNP	$339	8 min.
650PNP	$419	17 min.
1000**	$589	35 min.
1400**	$759	74 min.



- For **Multipath™ PC and peripheral protection,** choose new Back-UPS Office, featuring 6 outlets with guaranteed surge protection, 3 of which provide instantaneous battery backup, fax/modem protection, and BlockSafe™ outlet spacing for the accommodation of all size plugs and transformer blocks.

Back-UPS Office Multipath™ Protectio

For 386, Entertainment, education & all peripherals

Volt-Amp Rating	List Price	Runtime
250	$179	10 min.

- For **Basic PC protection,** choose from the Back-UPS family (software not included).

Back-UPS Basic PC Protection:

For 286, 386, Entertainment, and education

Volt-Amp Rating	List Price	Runtime*
200	$119	-
280	$139	7 min.
400	$199	13 min.
450	$254	24 min.
600	$359	31 min.
900	$529	47 min.
1250	$689	75 min.

- **For Fileserver protection,** ask for our award-winning Smart-UPS® line (not shown).
- **For Datacenter protection,** ask about our Matrix-UPS line (not shown).
- **For hardware-only surge protection,** ask for APC's SurgeArrest™ line (not shown).

*Runtime shown is for typical Pentium desktop system and may vary with your actual load.
Note: Back-UPS 200 not recommended for Pentium systems
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Jump-Start Enhanced CDs, Convert Video Files

HAS THIS HAPPENED TO YOU? You buy a new music CD and discover when you read the liner notes that it also contains a multimedia program with videos and interviews. Great! You pop the disc into your computer's CD-ROM drive—and nothing happens. Your computer can see the audio tracks, but not the data.

The problem is that not all CD-ROM drives can read Enhanced CDs, which use one of several techniques to combine the audio-format tracks with CD-ROM–format computer data. One technique places all the CD-ROM data on track 0, a solution that allows audio CD players to skip the computer data (which can damage stereo speakers if played as audio). Unfortunately, many NEC CD-ROM drives won't read track 0. If you have one of these, you're out of luck.

A second technique uses a new multisession format that segregates the audio and computer data into separate partitions of the CD-ROM. This may be another reason you can't play the Enhanced CD: Many CD-ROM drives are single-session, so can read only the first session on the disc. Other drives are multisession capable but require a driver upgrade to work with Enhanced CDs.

You can call your CD-ROM drive's manufacturer for help with Enhanced CD troubleshooting, but Corel's Enhanced Music Advisor program (see **FIGURE 1**) may be faster. You can download the utility, which takes the form of a Windows 95 wizard, from Corel's Web site (http://206.116.221.5/cdrivers/advisor.htm). Unzip the downloaded archive file (advisor.zip), then run emadvis.exe. You'll be able to test your drive for compatibility with both track 0 and multisession discs (a format that Advisor calls CD EXTRA), but you'll need to have an example of each in order to perform the test. Be sure to disable Windows 95's CD-ROM Auto Insert Notification feature before you run Enhanced Music Advisor—choose *Start•Settings•Control Panel•System•Device Manager*, select your CD-ROM drive, click *Properties•Settings*, uncheck *Auto insert notification*, and click *OK* twice.

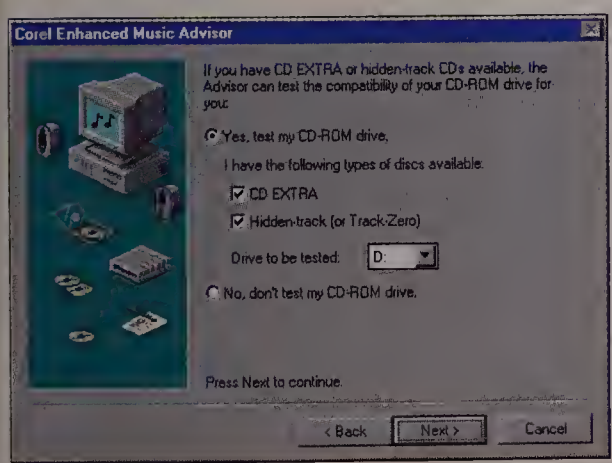


FIGURE 1: COREL'S Enhanced Music Advisor tests your CD-ROM drive for Enhanced CD compatibility.

DO AUDIO CDS WEAR OUT THE DRIVE?

MY DAD HAS WARNED ME not to play audio CDs on the PC because his friend said that doing so wears out the read head in the CD-ROM drive. I told him that CD-ROM drives read data with a laser beam, not a magnetic head like a floppy drive or hard disk, but he still insists that the read head in the drive wears out faster with audio CDs. Is he right?

Birju Patel,
Roselle Park, New Jersey

THANKFULLY, NO. Although it might be possible that an audio CD taxes your CD-ROM drive's laser and stepper motor more than the average CD-ROM–based game or reference work does, I've never heard of a worn-out CD-ROM drive. It'll probably become obsolete before it gives up the ghost.

CONVERT QUICKTIME VIDEO TO .AVI AND BACK AGAIN

NEED TO CONVERT a QuickTime .mov file to an .avi video? Download Intel's free SmartVid converter (see **FIGURE 2**) from the company's Web site (http://www.intel.com/pc-supp/multimed/indeo/SMARTVID.HTM). After you download and install the program, it will allow you to convert from one digital video format to the other. The program isn't perfect, however: QuickTime and .avi files have different approaches to interleaving audio and video data, and SmartVid can't convert this interleaving rate for you. As a result, converted files may not play as smoothly as the originals. SmartVid can't handle palette data, either.

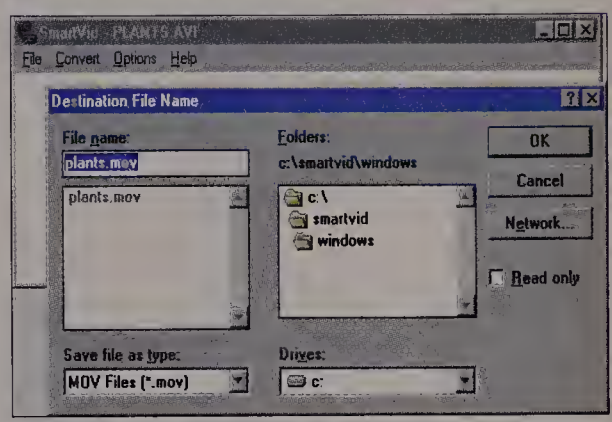
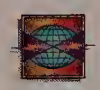


FIGURE 2: CONVERT DIGITAL VIDEO between QuickTime and .avi with Intel's free SmartVid.

Also, installing SmartVid, which comes in both DOS and 16-bit Windows flavors, isn't easy. Run the self-extracting archive file in a temporary directory, then read the detailed instructions that are contained in the install.txt file.

ONLINE TROVE OF MPEG AND RELATED VIDEO TOOLS

WHILE WE'RE ON THE TOPIC of digital video, let me tell you about a great source of free- and shareware video players, video editors, format converters, and other tools for PCs, Macs, and UNIX machines: Stephane Woillez's Multimedia Utilities page (http://www.prism.uvsq.fr/public/wos/multimedia/).



Find additional tips at http://www.pcworld.com/hereshow.html. Multimedia Tips *welcomes your questions and tips and pays $50 for published items. Scott Spanbauer is a contributing editor for* PC World *and author of* The No B.S. Guide to Windows 95 *(No Starch Press, 1996, 800/420-7240). See page 14 for contact information.* ■

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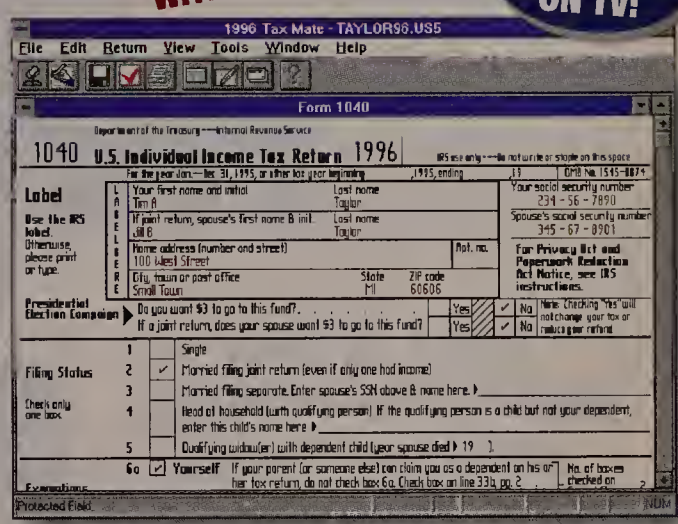

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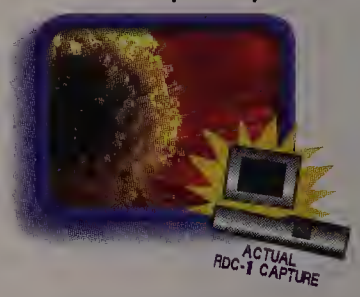

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Circle 71 on reader service card

Enhancing Your Memory

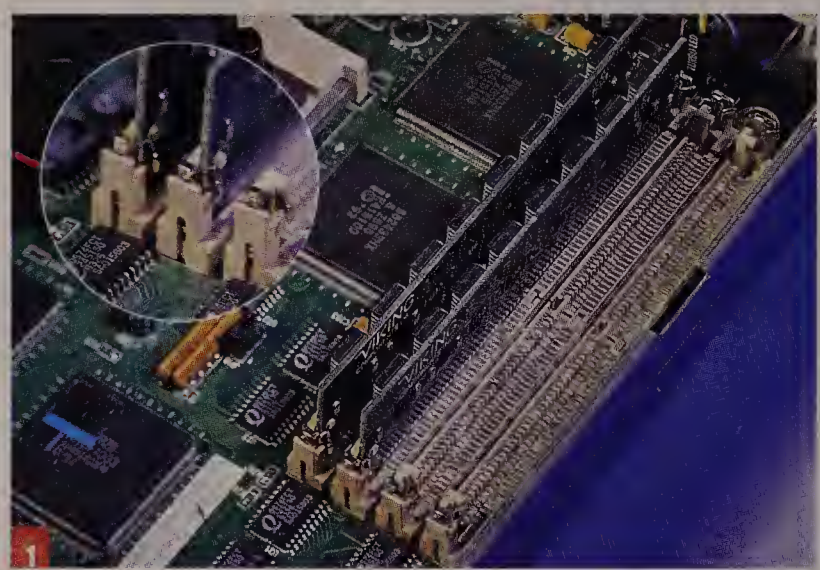
QUITE SUDDENLY THIS YEAR, memory got cheap—really, really cheap. That's cause for loud cheers among all Windows users who've grown tired of hearing their hard disks thrashing away.

If you're running Windows 3.*x* with less than 8MB of memory or Windows 95 with less than 16MB, adding memory is an obvious first upgrade for your machine (see "Upgrades: The Best for the Buck" in the November issue). And if you're juggling multiple resource-hungry applications, you may want to add even more memory. If so, do it now—there may never be a better time to buy memory.

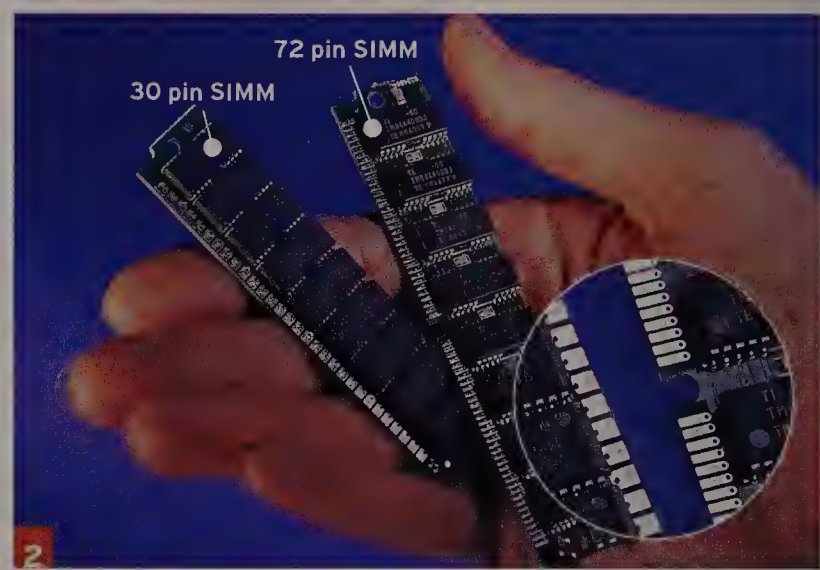
Adding memory is a snap as long as you avoid incompatible memory types. Here are the basics.

For more tips about installing additional memory, check PC out World Online (http://www.pcworld.com/hereshow/).

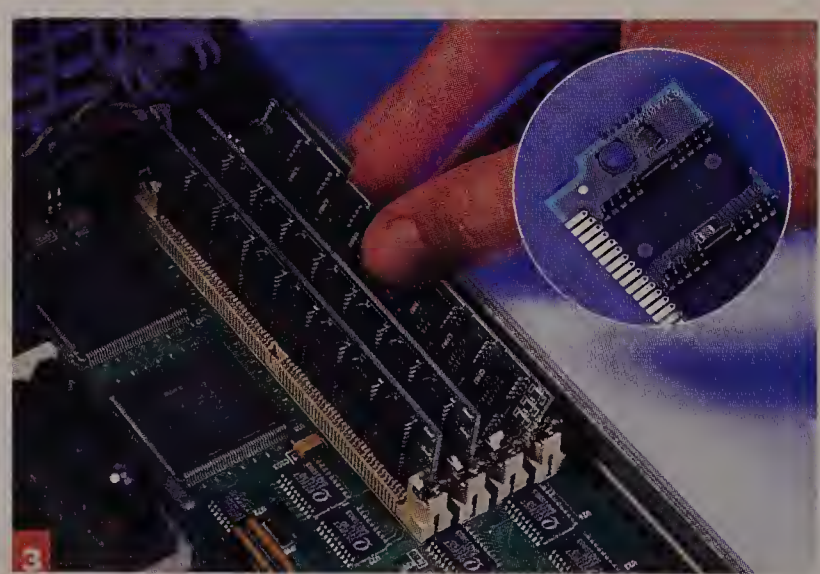
Stan Miastkowski is a contributing editor for PC World.



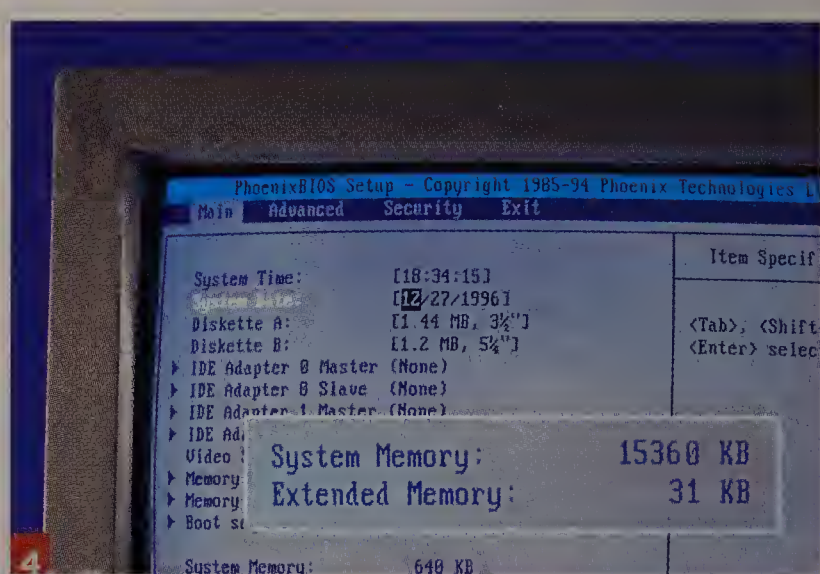
Check your memory. Open your PC's case and find the existing memory; it may be hidden under cables or other hardware. Most motherboards have four long white memory sockets, but some have more. Newer PCs typically use 72-pin single in-line memory modules, while most older PCs use 30-pin SIMMs. If all your system's memory sockets are filled, you can buy extenders that let you add more sockets or trade in your SIMMs for some with higher capacity.



Buy new memory. You should increase memory to at least 16MB for Windows 95. Check your PC's manual, and if you need more information call the manufacturer or your dealer. Except in ultrafast PCs, memory speed is usually not an issue. Some motherboards work with an odd number of SIMMs; others require that you install memory in matched pairs (two 4MB modules, for example). Consult your manual to determine the correct order for filling sockets with SIMMs.



Install the new memory. Ground yourself by touching a metal part of the PC case before you remove the SIMMs from their protective pouch. Orient the notch on each new SIMM (see inset), and insert it at an angle into the socket. Pressing down firmly, pivot the SIMM into a vertical position until the clips on each side click into place. The properly installed SIMM should be vertical and firmly seated in the socket. Don't force it. Leave the cover off your PC for now.



Update the BIOS. Turn on your PC. You should see the memory size "count up" to the new total. You'll probably also see an error message about memory size. Enter your PC's BIOS setup (a message that appears during boot-up usually tells how). Normally, this sets the new size automatically. If not, enter the size manually. Then exit BIOS setup and restart the system. When your PC counts up to the correct amount of memory, turn it off and then replace the cover.

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- 3.5" Modular Diskette Drive
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- 10.4" Color TFT (800x600) Display
- 16-Bit Audio with Built-in Dual Speakers
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- 3-Year Worldwide Limited Warranty*
- Windows® 95 or Windows 3.1

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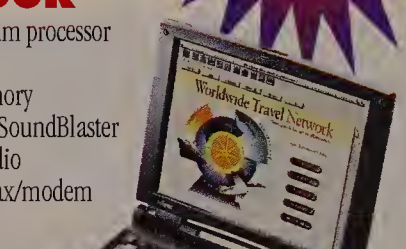
- 28.8 PCMCIA fax/modem

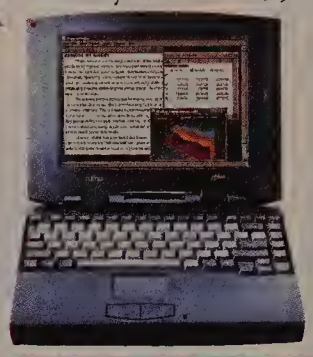


Montego Notebook

Model	Processor	Screen	RAM/HD	Price
Montego	Pentium 100	10.4" Active	8MB/1GB	$2499

Milan Notebook

- Up to 133MHz Pentium processors
- Up to 11.3" Super VGA displays
- Built-in 16-bit SoundBlaster audio
- Only 1.7" thick and 5.9 lbs.


Milan Notebook

Model	Processor	Screen	RAM/HD	Price
Milan	Pentium 100	10.4" Dual Scan	8/810MB	$1799 *
Milan	Pentium 100	10.4" Active	8/810MB	2499 *
Milan	Pentium 120	11.3" Active	8MB/1.2GB	3199
Milan	Pentium 120	11.3" Active	8MB/1.2GB	3349 *
Milan	Pentium 133	11.3" Active	16MB/1.2GB	3699
Milan	Pentium 133	11.3" Active	16MB/1.2GB	3849 *

* Features 28.8 PCMCIA fax/modem

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Monte Carlo Notebook

- Up to 133MHz Pentium processors
- Built-in 6X CD-ROM drive
- 2MB video memory
- 16MB RAM memory on selected models

Monte Carlo Notebook

Model	Processor	Screen	RAM/HD	Price
Monte Carlo	Pentium 100	11.3" Active	8/810MB	$299
Monte Carlo	Pentium 100	11.3" Active	8/810MB	314
Monte Carlo	Pentium 120	11.3" Active	16MB/1GB	369
Monte Carlo	Pentium 120	11.3" Active	16MB/1GB	384
Monte Carlo	Pentium 133	12.1" Active	16MB/1GB	449
Monte Carlo	Pentium 133	12.1" Active	16MB/1GB	464

* Features 28.8 PCMCIA fax/modem

Milan and Monte Carlo models are available with Windows for Workgroups or Windows 95

TOSHIBA

Satellite Pro 420

Satellite Pro 420

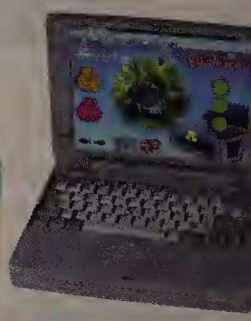
- Pentium 100MHz processor
- Built-in 6X CD-ROM drive
- 11.3" Dual Scan & Active Matrix displays
- Built-in SoundBlaster Pro compatible audio

Model	Processor	Screen	RAM/HD	Price
420CDS	Pentium 100	11.3" Dual Scan	8/772MB	$2499
420CDT	Pentium 100	11.3" Active	8MB/1.2GB	3299

Satellite 110

- Pentium 100MHz processors
- 11.3" Dual Scan and Active Matrix displays
- Built-in AC adapter
- Fast system performance with EDO RAM memory

Model	Processor	Screen	RAM/HD	Price
110CS	Pentium 100	11.3" Dual Scan	8/772MB	$1999
110CT	Pentium 100	11.3" Active	8/772MB	2499


Satellite 110

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Model	Processor	Screen	RAM/HD	Price
365X	Pentium 133	11.3" Dual Scan	BMB/1GB	$2499
365X	Pentium 120	10.4" Active	B/B10MB	2499
365XD	Pentium 120	10.4" Active	8/810MB	2699
365XD	Pentium 133	11.3" Active	8MB/1.4GB	3499

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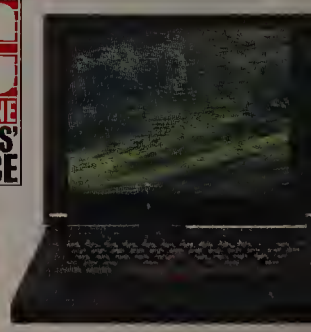
- 11.3" & 12.1" SVGA displays
- 16-bit SoundBlaster compatible audio
- External floppy drive reduces weight
- EDO RAM memory enhances performance
- Infrared transceiver for wireless communication

Model	Processor	Screen	RAM/HD	Price
560	Pentium 100	11.3" Dual Scan	8/810MB	$2699
560	Pentium 120	12.1" Active	8/810MB	3749
560	Pentium 133	12.1" Active	8MB/1.1GB	4199


ThinkPad® 560

COMPAQ

Armada

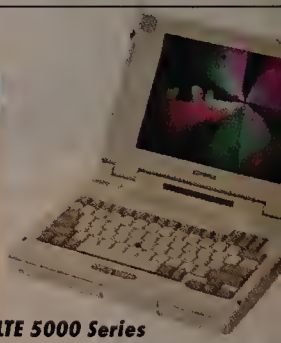
Compaq Armada

Model	Processor	Screen	RAM/HD	Price
1120	Pentium 100	10.4" Dual Scan	8/810MB	$1879
1120T	Pentium 100	10.4" Active	8/810MB	2199
4110	Pentium 100	11.3" Dual Scan	8/810MB	2479 *
4110D	Pentium 100	11.3" Dual Scan	8/810MB	2899 *†
4120	Pentium 120	11.3" Dual Scan	16MB/1.1GB	2999 *
4120T	Pentium 120	11.8" Active	16/810MB	3699 *
4130T	Pentium 133	11.8" Active	16MB/1.1GB	4399 *

* Features built-in audio † Includes 4X CD-ROM drive

LTE 5000 Series

Model	Processor	Screen	RAM/HD	Price
5150	Pentium 100	11.3" Dual Scan	8/810MB	$2849
5250	Pentium 120	10.4" Active	16/B10MB	3599
52B0	Pentium 120	11.3" Active	16MB/1.35GB	4349
5200	Pentium 120	10.4" Active	8MB/1.35GB	4720
5300	Pentium 133	12.1" Active	16MB/1.35GB	4749
53B0	Pentium 133	12.1" Active	16MB/2.2GB	6299


LTE 5000 Series

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NEC Versa 6000

Model	Processor	Screen	RAM/HD	Price
6010H	Pentium 133	11.3" Active	16MB/1.08GB	$3799
6030H	Pentium 133	12.1" Active	16MB/1.3GB	4999
6030X	Pentium 133	12.1" Active	16MB/1.4GB	5399

NEC Versa 4200

Model	Processor	Screen	RAM/HD	Price
4200	Pentium 100	10.4" Active	8/810MB	$2999
4230	Pentium 133	10.4" Active	8MB/1.0GB	3899

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Hitachi E™ Series Notebook

Hitachi E™ Series

Model	Processor	Screen	RAM/HD	Price
E100D	Pentium 100	11.3" Dual Scan	16/810MB	$1999
E133T	Pentium 133	11.3" Active	16/810MB	2999

Hitachi M™ Series

Model	Processor	Screen	RAM/HD	Price
M100D	Pentium 100	11.3" Dual Scan	8/810MB	$2099
M120T	Pentium 120	11.8" Active	16MB/1GB	3699
M133T	Pentium 133	11.8" Active	16MB/1GB	4399

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Extensa 600CD

Extensa 600

Model	Processor	Screen	RAM/HD	Price
600CD	Pentium 120	12.1" Dual Scan	8/810MB	$2249

TravelMate 6000

Model	Processor	Screen	RAM/HD	Price
6020	Pentium 120	11.3" Active	8MB/1.08GB	$4099
6030	Pentium 133	12.1" Active	16MB/1.35GB	4889
6050	Pentium 150	12.1" Active	16MB/1.35GB	5379

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Ascentia P

AST Ascentia P

Model	Processor	Screen	RAM/HD	Price
A40	Pentium 120	11.3" Dual Scan	16MB/1.0GB	$2499
A40	Pentium 120	12.1" Active	16MB/1.0GB	3199
P50	Pentium 133	12.1" Active	24MB/1.0GB	3979
P50	Pentium 133	12.1" Active	24MB/2.1GB	4349

AST Ascentia J

Model	Processor	Screen	RAM/HD	Price
J30	Pentium 100	10.4" Dual Scan	8/800MB	$2049
J30	Pentium 100	10.4" Active	8/800MB	2269
J50	Pentium 133	10.4" Active Matrix	8/800MB	2649

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Additional Ascentia J™ models available. Call for details.

SHARP®

Sharp WideNote

Sharp WideNote

Model	Processor	Screen	RAM/HD	Price
W100D	Pentium 133	11.2" Wide Dual Scan	16MB/1.1GB	$2999
W100T	Pentium 133	11.2" Wide Active	16MB/1.1GB	3499

Sharp 3000 & 9000

Model	Processor	Screen	RAM/HD	Price
3040	Pentium 100	12.1" Dual Scan	8MB/1.1GB	1799
9020	Pentium 120	12.1" Dual Scan	16MB/1.1GB	2899†
9050	Pentium 133	11.3" Active (SHA)	16MB/1.1GB	3499†
9080	Pentium 133	12.1" Active (SHA)	16MB/1.3GB	4999†

† Includes 6X CD-ROM drive

Additional models available. Call for details.

olivetti personal computers

Olivetti Echos Series Notebook

Olivetti Echos

Model	Processor	Screen	RAM/HD	Price
Echos	Pentium 100	11.3" Dual Scan	8MB/1.3GB	$1999
Echos	Pentium 100	10.4" Active	8MB/1.3GB	2599
Echos	Pentium 120	11.3" Active	8MB/1.3GB	2999
Echos	Pentium 133	11.8" Active	16MB/1.3GB	3799

6X CD-ROM

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NEW MULTIMEDIA HiNOTE VPs

Digital HiNote VP & VP 500

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HiNote VP	Pentium 120	11.3" Dual Scan	8/1.08MB	$1899
HiNote VP	Pentium 120	11.3" Dual Scan	8MB/1.0BGB	2449*
HiNote VP	Pentium 133	12.1" Active	8MB/1.44GB	3599*

* Features 6X CD-ROM drive

Digital HiNote Ultra II

Model	Processor	Screen	RAM/HD	Price
Ultra II	Pentium 133	11.3" Active	16MB/1.35GB	$4499
Ultra II	Pentium 150	11.3" Active	16MB/1.44GB	4799

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HP OmniBook 800 Notebook PC

HP OmniBook 800

Model	Processor	Screen	RAM/HD	Price
800CS	Pentium 100	10" Dual Scan	16/810MB	$2999
800CT	Pentium 133	10.4" Active	16MB/1.4GB	4279

HP OmniBook 5500

Model	Processor	Screen	RAM/HD	Price
5500CTS	Pentium 120	11.3" Dual Scan	16MB/1.35GB	$2999
5500CTS	Pentium 120	10.4" Active	16MB/1.35GB	3899
5500CTS	Pentium 120	12.1" Active	16MB/1.35GB	4149
5500CTS	Pentium 133	12.1" Active	16MB/1.35GB	4519
5500CTS	Pentium 133	12.1" Active	16MB/2GB	4859

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IBM Aptiva

Model	Processor	RAM/HD	CD	Price
C23	Pentium 120	16MB/1.6GB	BX	$1799
C33	Pentium 133	16MB/1.6GB	BX	1899
C65	Pentium 166	16MB/2.0GB	8X	2299
C73	Pentium 200	16MB/2.5GB	BX	2649
C77	Pentium 200	32MB/3.2GB	8X	2949
S64	Pentium 166	16MB/2.5GB	BX	2499
S66	Pentium 166	16MB/3.2GB	BX	2649
S74	Pentium 200	16MB/2.5GB	8X	2799
S78	Pentium 200	16MB/3.5GB	BX	3099

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Presario Multimedia

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- 33.6 data/fax/modem
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Model	Processor	RAM/HD	CD	Price
4704	Pentium 133	16MB/1.6GB	6X	$1599
4712	Pentium 166	24MB/2.5GB	6X	1999

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8X CD-ROM

Toshiba Multimedia

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3-D Surround Sound

Model	Processor	RAM/HD	CD	Price
7130	Pentium 133	16MB/1.6GB	8X	$1799
7160	Pentium 166	16MB/2.1GB	BX	2099
7200	Pentium 200	16MB/3.0GB	BX	2799

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- Integrated 3-D surround sound
- Video conferencing & tuner card on 9312 model

Model	Processor	RAM/HD	CD	Price
9304	Pentium 133	24MB/1.6GB	8X	$1699 *
930B	Pentium 166	24MB/2.5GB	BX	2199 *
9310	Pentium 166	24MB/2.5GB	BX	2499 *
9312	Pentium 166	24MB/2.5GB	BX	2599
9315	Pentium 166	32MB/2.5GB	BX	2699 *
9314	Pentium 200	24MB/4.0GB	8X	2699
9316	Pentium 200	32MB/3.0GB	8X	2899

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Model	Processor	RAM/HD	CD	Price
VAIO	Pentium 166	32MB/2.1GB	BX	$2499
VAIO	Pentium 200	32MB/2.5GB	BX	2899

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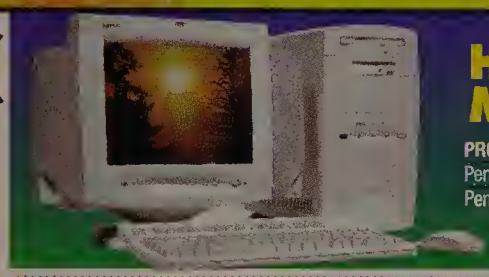

HP Pavilion Multimedia

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PRODUCT	PART #	PRICE
Pentium 90, 8MB, 1.2GB, Pavilion 7030	7030	$ 899
Pentium 120, 16MB, 1.6GB Pavilion 7055	7055	1299

Monitors priced separately

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PRODUCT	PART #	PRICE
Pentium 75, 8MB, 772MB	405CS	$ 1459
Pentium 90, 8MB, 772MB	415CS	1859

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Digital Venturis Desktop

PRODUCT	PART #	PRICE
Pentium 133, 16MB, 845MB	FR-928AA-BR	$ 999

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$189 — PCS10A-00R2

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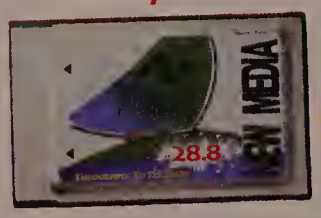

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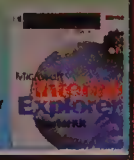

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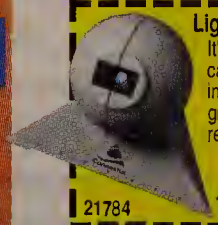

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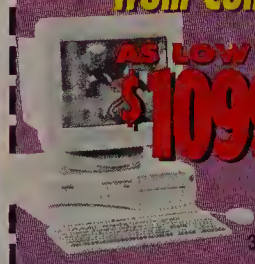

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COMPAQ

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32723	Pentium/133	4402	16MB/1.6GB	6X	1799**
32727	Pentium/166	4712	24MB/2.5GB	6X	2199

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- Windows 95, 3.1 and DOS
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31559	Pentium/100	5100	16MB/1.2GB	1399
31560	Pentium/120	5120	8MB/1.2GB	1399
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COMPAQ

Sku	Processor	Model	RAM/HD	Pri
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30515	Pentium/100	1120T	8MB/810MB	21

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34103

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Sku	Processor	Model	RAM/HD	Price
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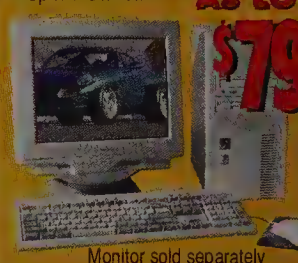

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Sku	Model	RAM/HD	Pr
26169	AMD 5X86-133	8MB/850MB	$7
32953	AMD K5-100	8MB/850MB	9
30476	CYRIX P150+	16MB/2GB	11
31853	CYRIX P200+	32MB/2.5GB	15

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30155	AcerNote Light	359	16/810MB	2299
32508	AcerNote Light	363	16/1.0GB	2499
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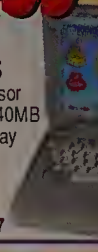

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Sku	Model	RAM/HD	Price
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30438	Satellite Pro 420CDT	8MB/1.2GB	3299
30440	Tecra 500CS	16MB/1.2GB	3598

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30780

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Pentium/120	SENS 810 P-120	1.3GB/8MB	3299
Pentium/120	SENS 810 P-120	1.3GB/16MB	3499
Pentium/133	SENS 810 P-133	1.3GB/16MB	3899
Pentium/133	SENS 810 P-133	2.1GB/8MB	3999
Pentium/133	SENS 810 P-133	2.1GB/16MB	4199

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Processor	Model	RAM/HD	Price
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Pentium/120	M-120T	1GB/16MB	4499
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31511	IBM Aptiva P150-16/2.0	2159-C55	1999
31517	IBM Aptiva P166-16/2.0G	2176-C65	2299
31615	IBM Aptiva P166-16/2.5G	2176-C67	2349
31616	IBM Aptiva P200-32/3.2G	2176-C77	2949

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Advantage Adventure 4000	4Meg/16Meg	39/124
Advantage Adventure 6000	4Meg/8Meg/16Meg/32Meg/64Meg	39/78/124/248/469
Advantage Adventure 8000	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Advantage Pro 486 SX33, SX25	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo LC	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Bravo LC 5100, 5133, 5168 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/69/144/249
Bravo MS	4Meg/8Meg/16Meg/32Meg	34/69/124/229
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Bravo MS-T 6150 (pairs)	4Meg/8Meg/16Meg/32Meg	34/69/124/229
Manhattan G, V (pairs)	8Meg/16Meg/32Meg	69/129/239
Premmia 4/33, 4/50, MTE 433 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/239
Premmia 4/66D, SE 4/33, 4/66 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/129/239
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Netserver LH Plus 5/133, 5/166 (EDD, ECC)	16Meg/32Meg/64Meg/128Meg	Call
Netserver 4/33LM – 5/100LM (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Netserver 5/75LS – 5/133 LS4 (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/249
Pavilion 5010-7170 (pairs)	4Meg/8Meg/16Meg/32Meg	49/79/129/249
Vectra 500 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra VA 6/180, 6/200 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra VE2 5/75 – 5/133 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra XA 6/180, 6/200 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	49/79/139/269
Vectra XM4 Series	4Meg/8Meg/16Meg/32Meg	49/79/139/269

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IBM PS/1, PS/2 MEMORY MODULES

Aptiva 300, 500 Series	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Aptiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Aptiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Aptiva C Series (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
Aptiva M Series	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 330 Model 6577 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
PC 340 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/249
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/119/219
PC 350 Model 6587 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC 360	4Meg/8Meg/16Meg/32Meg	44/69/129/229
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/259
PC 730 Model 6877 (EOD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/259
PC 750 Model 6887 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	39/59/144/219
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	49/69/139/259
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	12/39
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	49/79/139/249
P/S 2, 55SX, 65SX	4Meg	49
P/S 2, 53, 53LS, 56, 57	4Meg/8Meg	49/79
P/S 2, 95XP (ECC, pairs)	4Meg/8Meg	49/79
P/S 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249

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IBM NOTEBOOK & LAPTOP MEMORY

Thinkpad 340, 345, 355, 360, C, CE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 365C, CS, CD, E, ED	4Meg/16Meg	79/209
Thinkpad 365X, 365XD	8Meg/16Meg/32Meg	109/189/539
Thinkpad 500, 510CS	4Meg/8Meg/16Meg	79/109/219
Thinkpad 560	8Meg/16Meg/32Meg	109/189/539
Thinkpad 700, 720, 750, CL57SX	4Meg/8Meg/16Meg/32Meg	49/109/189379
Thinkpad 701, 701C	4Meg/8Meg/16Meg/32Meg	69/109/169/749
Thinkpad 730T, TE	4Meg/8Meg/16Meg	49/109/189
Thinkpad 755C, CE, CD, CS	4Meg/8Meg/16Meg/32Meg	49/109/179/339
Thinkpad 760C, CD, L, LD	4Meg/8Meg/16Meg/32Meg	99/179/339
Thinkpad 760E, E0, EL, EL0	8Meg/16Meg/32Meg	109/180/539

COMPAQ MEMORY MODULES

Deskpro 486/25, 33L, 50L	2Meg/8Meg/32Meg	39/99/249
Deskpro 3/25I, 33I, 4/25IS, 66I	2Meg/4Meg/8Meg	39/69/89
Deskpro 386, 486 M Series	2Meg/4Meg/8Meg	39/69/89
Deskpro M Series Expansion Board	0K (no memory)	119.00
Deskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	34/59/119/219
Deskpro 575, 5120, 5133, 5150, 5160 (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 2000, 4000, 6000 Series (EDD, pairs)	4Meg/8Meg/16Meg/32Meg	34/59/139/249
Deskpro 5/60M, 5/66M, XE560 (quads)	2Meg/4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL (pairs)	4Meg/8Meg/16Meg/32Meg	39/49/69/139/239
Deskpro XL 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 833, 850, 860, 866	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Presario 5528, 7110, 7152	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	34/59/109/219
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Proliant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	39/64/119/239
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	39/64/119/239/599
Proliant 5000, 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 4/25S, 4/33, 4/66	2Meg/4Meg/8Meg	39/49/69
Prolinea (enhanced), MT	4Meg/8Meg/16Meg/32Meg	49/69/129/229
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 5100, 5120, 5133, 5150, 5166 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	39/69/139/259
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/239
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	69/119/239
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/259
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	39/69/119/259

COMPAQ NOTEBOOK & LAPTOP MEMORY

Armeda 1120, T	8Meg/16Meg/32Meg/64Meg	119/199/Call/Call
Armada 4100, 4110, 4120, 4130	8Meg/16Meg/32Meg Kit	Call
Concerto 4/25, 433	4Meg/8Meg/16Meg	79/99/169
Contura 4/25, C, CX	4Meg/8Meg/16Meg	79/99/169
Contura 400C, 400CX, 410C, 410CX	4Meg/8Meg/16Meg	79/99/169
Contura 420C, 420CX, 430C, 430CX	4Meg/8Meg/16Meg/24Meg	49/79/169/239
Contura Aero 4/25, 4/33	4Meg/8Meg/16Meg	69/99/169
LTE 5000, 5100, 5200, 5300	8Meg/16Meg/32Meg/64 Meg Kit	99/149/266/513
LTE Elite 4140C, CX, 4/75CX	4Meg/8Meg/16Meg/24Meg	49/89/179/249

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	DK Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631, 641, 645	–	–	69	89	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	39	–	–	–	49	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	39	–	–	69	–	–	94	144	309
Canon LBP4, 4Lite, 4plus	–	–	129	179	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	129	–	–	229	–	–	–	–	–
Epson Action Laser 1100, 1600	–	–	69	70	–	–	90	–	–	199	359	–
Epson Action Laser II	–	–	74	–	173	–	–	272	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	89	–	173	–	–	272	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	89	–	–	178	–	–	–	–	–
HP 2, 2D–	–	–	–	69	–	–	90	–	–	–	–	–
HP 3, 3D, 3P, 2P 2P+	–	–	–	*69*	–	–	*99*	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	49	–	–	59	–	–	99	–	–
HP 4P, 4PLUS, 4MPm 1600, 1600CM	–	–	19	29	–	–	49	–	–	89	–	–
HP 4L	–	–	34	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	39	–	–	–	69	–	–	99	–	–
HP 5L	–	–	49	74	–	–	89	–	–	199	–	–
HP 5P, 5MP, 4V, 4MV	–	–	19	39	–	–	49	–	–	89	124	–
HP Design Jet 600, 650, 200	–	–	–	39	–	–	49	–	–	89	139	230
HP Deskjet 500, 500C, 510, 550,560	–	*34*	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	39	–	–	49	–	–	89	–	–
HP Paintjet XL300	54	–	–	–	–	–	69	–	–	144	299	–
IBM Laser 4019, 4019E	–	–	–	–	–	130	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	89	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	*69*	–	–	*89*	–	–	*189*	–	–
Konica LP-3110, 3115	–	–	119	189	239	–	–	–	–	–	–	–
Lexmark Medley 4C, 4x, 4SX	–	–	Call	Call	Call	–	–	–	–	–	–	–
Lexmark, Dptra L, LX, R, RX	–	–	–	–	–	–	59	–	–	94	139	259
Lexmark Valuwriter 300,600	–	–	29	39	–	–	89	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	89	–	–	–	–	–
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	89	109	169	–	189	–	–	–	–	–
Dki 810E, EX, 600E, EX, 610E, EX	–	–	29	39	–	–	79	–	–	119	179	–
Dki 830, 840	–	–	–	89	–	–	–	–	–	–	–	–
Dki 2350, 2450	–	–	Call	Call	–	–	–	–	–	–	–	–
Packard Bell P8 9500	–	–	–	139	–	–	227	–	–	–	–	–
Packard Bell 9815	–	–	–	130	–	–	229	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	99	–	–	169	–	–	–	–	–
Panasonic 4410/4430	–	–	–	*89*	–	–	*129*	–	–	–	–	–
Panasonic 4450	–	–	89	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	89	99	–	–	189	–	–	–	–	–
Panasonic 4440, 5410, 6500	–	–	79	99	–	–	159	–	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	–	69	99	–	–	149	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	79	–	–	–	259	–	–	–	–	–
TI XL/PS17/PS35	–	–	49	–	–	–	–	–	–	–	–	–
TI Microlaser Pro E, Powerpro, Pro 600	–	–	89	129	–	–	189	–	–	329	–	–
TI Microwriter	–	–	79	119	–	–	–	–	–	–	–	–

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Compaq Contura 410, 420, 430 — $109.00
Epson ActionNote 800, 866C, 880C — $134.00
NEC Versa E, V — $119.00
NEC Versa S — $119.00
Toshiba 610 and 400 — Call
Toshiba 1900, 1910, 1950, 1960 — $119.00
Toshiba 2400, 4700, 4800, 4900 — $119.00
Toshiba 2100 Series — $121.00

TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
Tecra 500/P650	*8Meg/16Meg/32Meg/48Meg/128Meg*		*119/239/459/Call/Call*
Tecra 700 (SDRAM)	*8Meg/16Meg/32Meg*		*119/259/429*
Tecra 710, 720	*8Meg/16Meg/32Meg/64Meg/128Meg*		*119/259/429/Call/Call*
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2000U	94.00
T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		69/89/169/229
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	69.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	79.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg/32Meg	PC-PA2014U	159/279
T3400CT, T2400, T3600	4Meg/8Meg/16Meg/24Meg	PC-PA2019U	89/119/179/Call
T100, 105, 110, 115	*8Meg/16Meg/32Meg*		*119/189/319*
T400, 405, 410, 415, 420, 425	*8Meg/16Meg/32Meg*		*119/189/319*
T400CS, 400CDT, T100, 105 Edo	*8Meg/16Meg/32Meg*		*119/189/319*
T600, 610, CT Edo	8Meg/16Meg/32Meg		119/189/319

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACERNote 730C, 735C, 760C, 760CX, 780CX	2Meg/4Meg/8Meg		49/69/99
ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg		59/79/159
ACERNote Light 350, 352, 355	4Meg/8Meg/16Meg		69/99/169
ACERNote Light 356, 358, 359, 361 (pairs)	4Meg/8Meg/16Meg		69/99/169
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg		79/109/189
Ambra N Series	*4Meg/8Meg/12Meg/16 Meg*		*89/109/139/189*
Ambra SN Series	4Meg/16 Meg		79/179
Ambra N-75, N-100	4Meg/8/16		49/89/169
AST Ascentia P30, P50	*8Meg/16Meg/32Meg*		*89/189/309*
AST Ascentia J10, J30, J50	*8Meg/16Meg/32Meg/40Meg Kit*		*99/189/Call/Call*
AST Ascentia 900N, 800N, 810, 910	8Meg/16Meg		99/189
AST Ascentia 950	8Meg/16Meg		99/189
AST Bravo & Explorer	*4Meg/16Meg*	*501255-001, -002*	*79/219*
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	69.00
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166-001, -003	79/189
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	79/189
AT&T Globalyst 130, 200, 250	4Meg/8Meg/16Meg		69/99/149
Austin DX4, DX2, SX2, SX Series	4Meg/16Meg		79/219
Austin Vista	*4Meg/8Meg/16Meg/20Meg*		*Call*
Canon Innova Book 150, 175	4Meg/16Meg		69/169
Canon Innova Book 200LS	4Meg/8Meg/16Meg/24Meg		69/99/219/349
Canon Innova Book 350CO, 360, 475	*8Meg/16Meg*		*89/169*
Canon Innova 486-10	4Meg/16Meg		79/219
CTX EZ Book 5x86 Pent, Series	*4Meg/8Meg/16Meg*		*Call*
DEC HiNote, Ultra HiNote	4Meg/8Meg/16Meg		69/109/189
DEC HiNote VP	*8Meg/16Meg/32Meg*		*89/189/299*
Dell Lattitude LM (pairs)	*4Meg/8Meg/16Meg*		*69/99/189*
Dell Lattitude 433, C, CX	4Meg/16Meg		79/199
Dell Lattitude LMP (pairs)	4Meg/8Meg/16Meg		79/119/199
Dell Lattitude LX, M	4Meg/8Meg/16Meg		79/119/199
Dell Latitude XP, XPI	4 Meg/8Meg/16 Meg		79/119/199
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg		69/109/189
Epson ActionNote 700, 700c, 700cx	4Meg/16Meg		79/189
Epson ActionNote 880, 866c, 890	4Meg/8Meg/16Meg/20Meg		59/89/159/199
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50, 4000	6Meg		79.00
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	89.00
Fujitsu Monte Carlo	*8Meg/16Meg/32Meg*		*79/159/299*
Gateway 2000 Colorbook 4/33	4Meg/16Meg		69/179
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		159/759
Gateway 2000 486 Handbook or Liberty	4Meg/16Meg		59/169
Gateway 2000 Solo Series	4Meg/8Meg/16Meg		79/109/199
Gateway 2100 Solo Series	8Meg/16Meg/32Meg		Call/Call/Call
Hitachi C-Series	*8Meg/16Meg/32Meg*		*99/189/369*
Hitachi M-Series	*8Meg/16Meg/32Meg*		*129/249/516*
HP Omnibook 300, 480, 425	2Meg/4Meg		83/129
HP Omnibook 530, 600	4Meg/8Meg/12Meg		69/89/149
HP Omnibook 4000	4Meg/8Meg/16Meg		69/89/169
HP Omnibook 5000	8Meg/16Meg/32Meg		89/169/319
Leading Edge Aviva 2000	4Meg/16Meg		69/179
Lexmark SE10	4Meg/8Meg		79/119
Magnavox Metalis	4Meg	286, 386SX	119.00
Micron Transport Pentium	8Meg/16Meg Kit		119/219
Midwest Micro Elite or Soundbook	4Meg/8Meg/16Meg		79/119/199
Midwest Micro Elite or Soundbook Plus or Sndbk II, IIP	4Meg/8Meg/16Meg		79/119/199
Midwest Micro Elite or Soundbook CD	4Meg/8Meg/16Meg		79/119/199
NCR Satari 3180, 3181	4Meg/8Meg		79/119
NEC Ultralite Versa, E, V, MP	4 Meg/8Meg/16Meg/20Meg	DP4104	64/99/199/299
NEC Versa S, Versa 2000C & 2000D, 500	4Meg/8Meg/16Meg		59/99/169
NEC Versa 4000, 4050/4080	4/8/16/32Meg		69/99/169/299
NEC Versa 6000	*8/16/32Meg*		*169/299/339*
Olivetti Echos P75-P1335 (pairs)	4Meg/8Meg/16Meg		89/129/219
Packard Bell 386SX, 286	4Meg	286, 386SX	89.00
Packard Bell Statesman	2Meg/8Meg		49/99
Panasonic CF-V21P, CF-580	4Meg/16Meg		69/169
Panasonic CF-V41	4Meg/8Meg/16Meg/32Meg		79/119/219/369
Sager Midern, all models	*4Meg/8Meg/16Meg/32Meg*		*Call*
Samsung Sens 810	8Meg/16Meg		Call
Sanyo 17/18 N8	2Meg	M8C-NBMEM2	89.00
Sceptre Soundx, all models	*4Meg/8Meg/16Meg*		*89/129/239*
Sharp 3030, 3070	*8Meg/16Meg/32Meg*		*109/179/349*
Sharp 6781, 6881, 6785, 6700, 6800, 6741	2Meg/4Meg		79/129
Sharp 8150, 8650, 8660, 7700, 7760	4Meg/16Meg		69/189
Sharp 8700, 8800, 8900	4Meg/8Meg/16Meg		69/109/189
Sharp 3010, 3020, 3050, 3060	4Meg/8Meg/16Meg		69/109/189
Sharp 9000, 9030	8Meg/16Meg/32Meg		79/189/399
Sharp 9040, 9070 (pairs)	4Meg/8Meg/16Meg/32Meg		69/129/265/525
TI 4000, TI 4000E, TI 4000M	4Meg/16Meg		140/719
TI 5000, 5100, 5200, 5300	*8Meg/16Meg*		*99/199*
TI 6020, 6030	*8Meg/16Meg/32Meg*		*219/399/Call*
TI Extensa, 450, 450T, 455, 455T, 570	4Meg/8Meg/16Meg		59/99/169
TI Extensa, 550, 555, 560, 565 (pairs)	*4Meg/8Meg/16Meg*		*59/99/169*
Tandy 2820, 3820, 3830	2Meg/4Meg/6 Meg		65/99/135
Tulip, all models	*4Meg/8Meg/16Meg/32Meg/64Meg*		*Call*
Twinhead, Altima, Compudyne, 486SX, OX, Tandy 4860	4Meg/16Meg		79/189
Twinhead Slimnote 5	4Meg/8Meg/16Meg		79/99/189
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Zenith Master Sport SL, SLE, 600, 620, 625NL	2Meg	ZA-4-4	69.00
Zenith Z-Note 425LN, LNC, LNP	4Meg		85.00
Zenith Z-Note MX	4Meg/8Meg/16Meg		89/99/179
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S-RAM Cards 2MEG	199	8X CD Rom	449
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		1.6 GIG		239	1.6 GIG	AC31600	259
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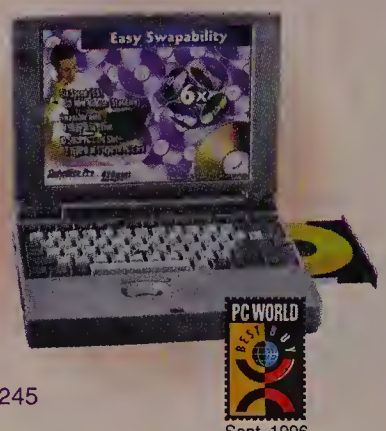

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PC MAGAZINE EDITORS' CHOICE August 1996 AST Ascentia J50

WINDOWS 1996 WIN 100

AST J30 Models

Model	CPU	Hard drive	Color display	Price	CDW
J20 CSS11	100MHz Pentium	540MB	11.3" SVGA dual-scan	$1642.82	73027
J20 CSS11	100MHz Pentium	800MB	11.3" SVGA dual-scan	$1721.03	73497
J30 CTS10	100MHz Pentium	800MB	10.4" SVGA active-matrix	$2139.88	64483
J50 CTS10	133MHz Pentium	800MB	10.4" SVGA active-matrix	$2514.56	67377

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◆ 100MHz, 120MHz or 133MHz Intel® Pentium® processor ◆ 16KB internal cache, 256KB L2 cache ◆ RAM: 8MB or 16MB standard, expandable to 40MB ◆ 800MB, 1.2GB or 2.1GB removable hard drive ◆ SmartBay™ houses a 4X or 6X CD-ROM drive, interchangeable with a floppy drive or optional Lithium ion battery ◆ 11.3" dual-scan (CSS models) or active-matrix (CTS models) SVGA color display ◆ 28.8K bps data/fax internal modem (P40) ◆ Pre-installed Windows® 95 ◆ 3-year limited warranty with 48-Hour Rapid Repair for 1-year

Model	CPU	RAM	Hard drive	CD-ROM	Price	CDW
P30 CSS11	100MHz Pentium	8MB	800MB	4X	$2298.42	65838
P30 CSS11	100MHz Pentium	8MB	1.2GB	4X	$2488.56	65839
P40 CTS11	120MHz Pentium	16MB	2.1GB	6X	$3751.44	73029
P50 CTS11	133MHz Pentium	8MB	800MB	4X	$3367.72	65840
P50 CTS11	133MHz Pentium	8MB	1.2GB	4X	$3647.10	65841

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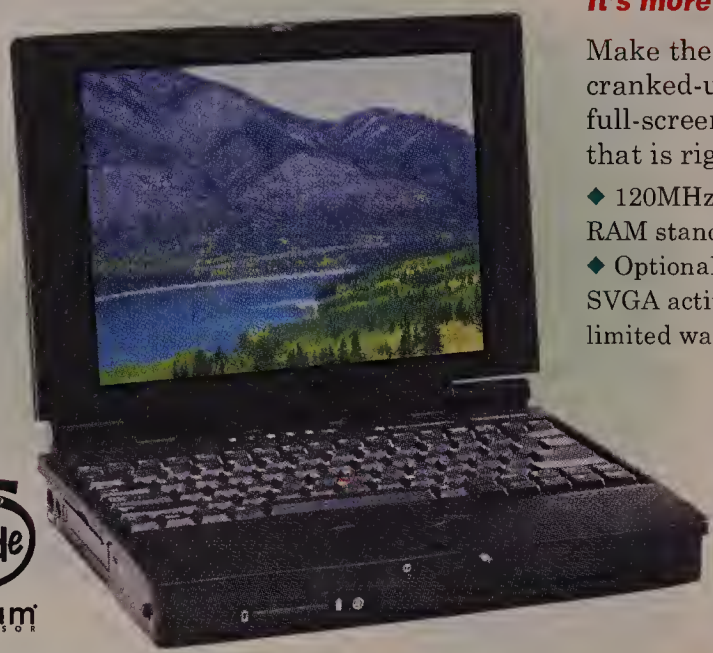

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Extensa 650CD

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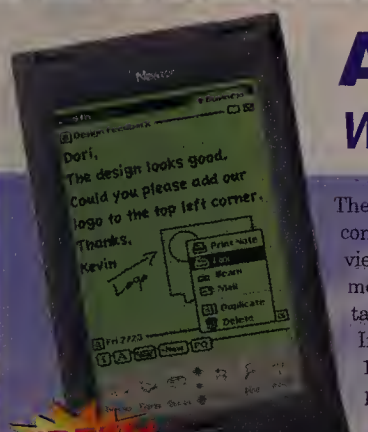

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intel inside pentium processor

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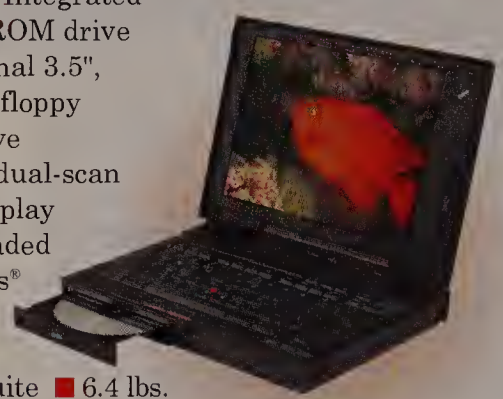
■ 5x86C CPU ■ 8MB RAM standard, expandable to 24MB ■ 540MB hard drive ■ Integrated 4X CD-ROM drive ■ External 3.5", 1.44MB floppy disk drive ■ 10.4" dual-scan color display ■ Preloaded Windows® 95 and Lotus SmartSuite ■ 6.4 lbs. ■ 1-year warranty with International Warranty Service®



ThinkPad 365ED with CD-ROM

$1899.00 CDW 68649

ThinkPad 365 Port Replicator/Charger

$169.47 CDW 71099

Aptiva S Series

Not just a new look, a new level of functionality

The Aptiva S Series features a breakthrough, space-saving design with a unique media console that allows easy access to the CD-ROM drive and floppy drive. This allows the mini-tower CPU to be placed up to six feet away—even under your desk!

■ 166MHz (S64, S66) or 200MHz (S74, S78) Intel Pentium® processor ■ 256KB Level 2 cache ■ 16MB (S64, S66, S74) or 32MB (S78) EDO RAM standard, expandable to 128MB ■ 2.5GB (S64, S74) or 3.2GB (S66, S78) hard disk drive ■ "Pop-up" media console: 1.44MB, 3.5" diskette drive and 8X CD-ROM drive ■ 28.8K bps DSVD data/fax/voice modem (free software upgradeability to 33.6K bps) ■ Voicemail, speakerphone and Caller ID capabilities ■ Keyboard and mouse (S64, S74) ■ Keyboard, cordless mouse and joystick (S66, S78) ■ Windows® 95 software ■ 3-year limited warranty

Aptiva S64	**$2499.00**	CDW 74046
Aptiva S66	**$2649.00**	CDW 74047
Aptiva S74	**$2799.00**	CDW 74048
Aptiva S78	**$3099.00**	CDW 74049

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intel inside pentium processor

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- ✔ 33.6K bps fax/data/voice modem
- ✔ IrDA compliant
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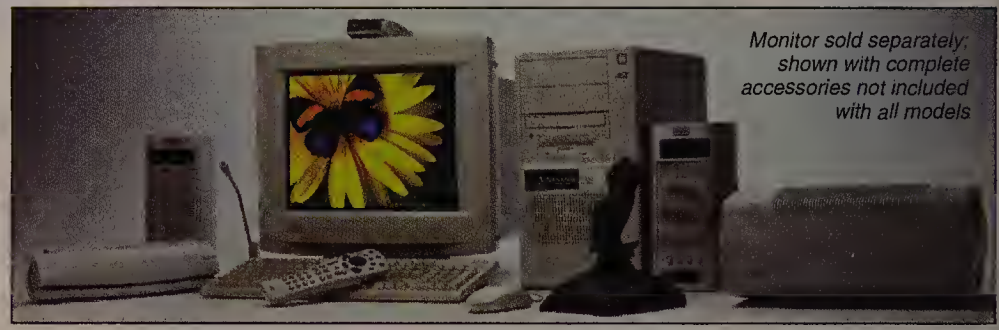
9312
- ✔ DSVD 28.8K bps fax/data/voice modem
- ✔ Video conferencing software, TV tuner card and more!

9315/9316
- ✔ 3D graphics, 2MB video memory
- ✔ Joystick, stereo speakers w/subwoofer and more!

AST Advantage! Series mini-tower PCs

Multimedia home computing



AST Advantage! Lifestyle mini-tower PCs

Model	CPU	RAM	Hard drive	CD-ROM	Price	CDW
9310	166MHz Pentium	24MB	2.5GB	8X	$2499.00	71901
9312	166MHz Pentium	24MB	2.5GB	8X	$2599.00	71902
9315	166MHz Pentium	32MB	2.5GB	8X	$2699.00	71903
9316	200MHz Pentium	32MB	3GB	8X	$2899.00	71905

AST Advantage! mini-tower PCs

Model	CPU	RAM	Hard drive	CD-ROM	Modem	Price	CDW
9304	133MHz Pentium	24MB	1.6GB	8X	33.6K bps	$1699.00	71898
9208	166MHz Pentium	16MB	1.6GB	8X	33.6K bps	$1899.00	75071
9308	166MHz Pentium	24MB	2.5GB	8X	33.6K bps	$2199.00	71899
9314	200MHz Pentium	24MB	4GB	8X	33.6K bps	$2699.00	71900

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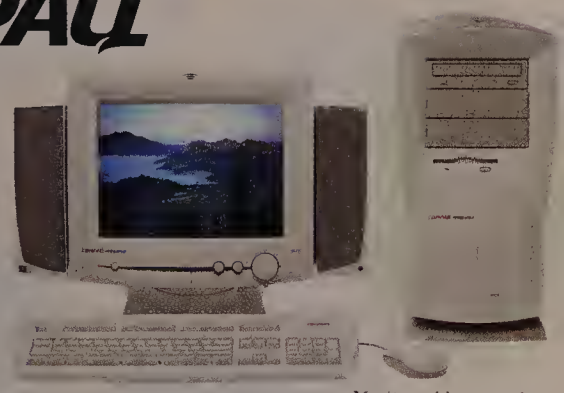
COMPAQ

Presario 4704



✔ 133MHz Intel® Pentium® processor ✔ RAM: 16MB EDO RAM standard, 128MB maximum ✔ 1.6GB hard disk drive ✔ Internal 6X CD-ROM drive ✔ 32-bit PCI accelerated graphics ✔ 1280 x 1024 maximum resolution ✔ JBL Pro stereo speakers ✔ 33.6K bps DSVD data/fax/voice modem ✔ Compaq keyboard and 2-button mouse ✔ Software included: Microsoft® Windows 95, Compaq Phone Center, Microsoft Works, CorelDRAW 5, and more! ✔ 1-year limited warranty

Monitor sold separately

$1699.00 CDW 73389

Presario 6704

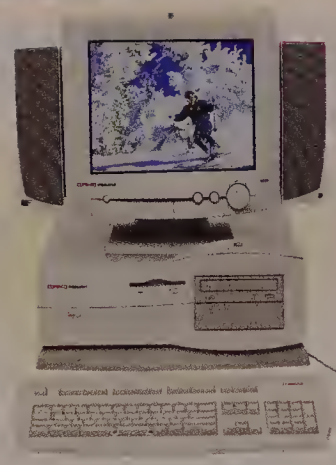
✔ 166MHz Intel® Pentium® processor ✔ RAM: 24MB EDO RAM standard, 128MB maximum ✔ 2.5GB hard disk drive ✔ 1.44MB, 3.5" diskette drive ✔ Internal 8X CD-ROM drive ✔ 1280 x 1024 maximum resolution ✔ JBL Pro stereo speakers ✔ 33.6K bps DSVD data/fax/ voice modem ✔ Compaq keyboard and 2-button mouse ✔ Software included: Microsoft® Windows 95, Word and PowerPoint; Lotus 1-2-3; Compaq Phone Center; CorelDRAW 5 and more! ✔ 1-year limited warranty

$2399.00 CDW 73392

Presario 4112

✔ 120MHz Intel® Pentium® processor ✔ 16MB EDO RAM standard, expandable to 72MB RAM ✔ 1.6GB hard disk drive ✔ Internal 6X CD-ROM drive ✔ Includes JBL Pro stereo speakers ✔ 33.6K bps DSVD data/fax/voice modem ✔ Software: Microsoft® Windows 95; Compaq Phone Center; Compton's Interactive Encyclopedia 96; Quicken Special Edition Multimedia; Microsoft Works; CorelDRAW 5 and more ✔ 1-year limited warranty

intel inside pentium PROCESSOR



Monitor sold separately

$1499.00 CDW 73385

Compaq Presarios

Desktop	CPU	RAM	Hard drive	CD-ROM	Price	CDW
4402*	133MHz Pentium	16MB	1.6GB	6X	$1999.00	73388
4122	150MHz Pentium	16MB	2.5GB	8X	$1899.00	73386
Mini-tower	**CPU**	**RAM**	**Hard drive**	**CD-ROM**	**Price**	**CDW**
4712	166MHz Pentium	24MB	2.5GB	6X	$2199.00	73390
4716	200MHz Pentium	32MB	2.5GB	8X	$2799.00	73391
6708	200MHz Pentium	32MB	2.5GB	8X	$2999.00	73393
8702	166MHz Pentium	24MB	2.5GB	8X	$2499.00	73394

*All-in-one design includes built-in 15" monitor

Deskpro 2000, 4000 and 6000 Series

The new Compaq Deskpro 2000, Deskpro 4000 and Deskpro 6000 product families set new standards for cost of ownership and serviceability in desktop personal computing for small, medium and large businesses. Compaq adds Intelligent Manageability to its entry level Deskpro 2000 line and includes new desktop manageability features to the Deskpro 4000 and Deskpro 6000 models—Inventory, Fault and Security Management—making Deskpros easier to inventory, troubleshoot, and protect. This second generation of Intelligent Manageability also offers a unique Smart Cover Sensor on the hood of the PC that alerts users and systems administrators of unauthorized access. The entire product line also comes equipped with significantly enhanced levels of serviceability that enables major components of the PC to be removed and replaced within five minutes or less. These include quick-release cover latches, a slide-out system board, and removable expansion board and hard drive cage.

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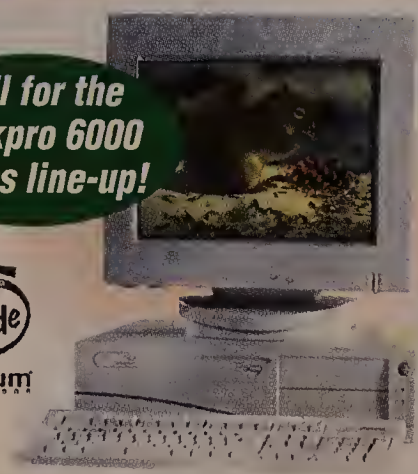

Monitor sold separately

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Compaq Deskpro 2000 series

Desktop	CPU	RAM	Hard drive	Price	CDW
5100/630	100MHz Pentium	8MB	630MB	$1199.00	72604
5100/1200	100MHz Pentium	8MB	1.2GB	$1289.00	72611
5100/1200	100MHz Pentium	16MB	1.2GB	$1389.00	72754
5120/1200	120MHz Pentium	8MB	1.2GB	$1399.00	72607
5120/1200	120MHz Pentium	16MB	1.2GB	$1499.00	72612
5133/1200	133MHz Pentium	16MB	1.2GB	$1659.00	72608
5133/2500	133MHz Pentium	16MB	2.5GB	$1859.00	72613
5166/1200	166MHz Pentium	16MB	1.2GB	$1969.00	72610
5166/2500	166MHz Pentium	16MB	2.5GB	$2169.00	72614
5200/2500	200MHz Pentium	32MB	2.5GB	$2769.00	72755
6180/1200/CD	180MHz Pentium Pro	16MB	1.2GB	$2549.00	72756
6200/2500/CD	200MHz Pentium Pro	16MB	2.5GB	$3159.00	72762

Mini-tower configurations also available.

Compaq Deskpro 4000 series

Desktop	CPU	RAM	Hard drive	Price	CDW
5120/1080	120MHz Pentium	16MB	1.08GB	$1629.00	72691
5120/1620/LS	120MHz Pentium	16MB	1.62GB	$1879.00	72692
5133/1080	133MHz Pentium	16MB	1.08GB	$1809.00	72766
5133/1620	133MHz Pentium	16MB	1.62GB	$1879.00	72768
5166/1620	166MHz Pentium	16MB	1.62GB	$2189.00	72770
5166/2500/LS	166MHz Pentium	16MB	2.5GB	$250900	72771
6180/1620/CDS	180MHz Pentium Pro	32MB	1.62GB	$3059.00	72778
6200/2500/LS/CDS	200MHz Pentium Pro	32MB	2.5GB	$3639.00	72779

Mini-tower configurations also available.

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Desktop	CPU	RAM	Hard drive	CD-ROM	Price	CDW
520CD	133MHz Pentium	16MB	1.2GB	8X	$1731.34	76404
Mini-tower	**CPU**	**RAM**	**Hard drive**	**CD-ROM**	**Price**	**CDW**
525MCx	133MHz Pentium	16MB	1.2GB	8X	$1905.72	76405
525CD	166MHz Pentium	16MB	1.6GB	8X	$2071.12	76406

Included software!

✔ Microsoft Windows® 95 ✔ Microsoft Word (except CDW 76397) ✔ McAfee VirusScan ✔ Adobe Acrobat Reader and much more!

Hewlett Packard Vectra 500 Series PCs

Desktop	CPU	RAM	Hard drive	CD-ROM	Price	CDW
520MCx	120MHz Pentium	12MB	1.2GB	8X	$1533.75	76395
520	133MHz Pentium	16MB	1.2GB	—	$1279.84	76397
520CD	133MHz Pentium	16MB	1.2GB	8X	$1534.65	76398
520MCx	133MHz Pentium	16MB	1.2GB	8X	$1717.86	76399
Mini-tower	**CPU**	**RAM**	**Hard drive**	**CD-ROM**	**Price**	**CDW**
525CD	166MHz Pentium	16MB	1.6GB	8X	$1894.94	76401
525MCx	166MHz Pentium	16MB	1.6GB	8X	$2094.49	76400
525CD	200MHz Pentium	16MB	2.5GB	8X	$2196.31	76402
525MCx	200MHz Pentium	32MB	2.5GB	8X	$2584.40	76403

As low a
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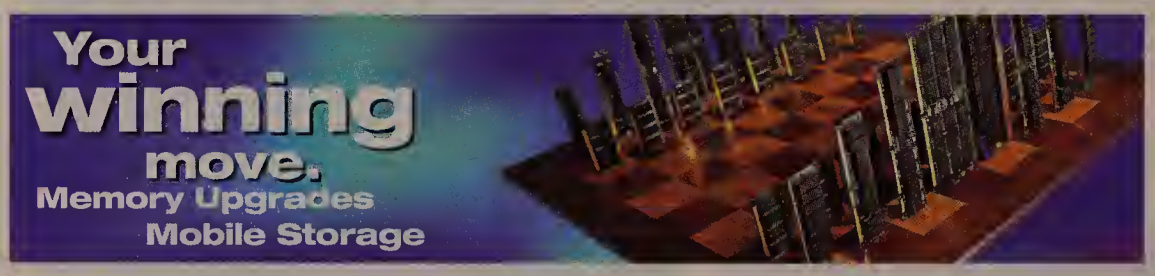

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Armada 4100
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Tecra 500	32MB	$381.35	74238
Tecra 500	48MB	$581.49	73608
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Tecra 700	8MB	$129.31	63615
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Versa 4000 E, M, P, V	32MB	$412.74	59565
Versa 6000	8MB	$129.31	73594
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Versa 6000	32MB	$412.74	73596

IBM

Thinkpad 760	8MB	$207.65	64562
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Thinkpad 750, 755	8MB	$127.19	41041
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AST

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Ascentia 900N, 910N	8MB	$129.96	45233
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COMPAQ

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LTE 5000 Series	8MB Kit	$105.07	61396
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* Must be installed in pairs			
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Princeton Graphic Systems (PGS) is a leading producer of high-resolution color monitors for the PC and Macintosh™ markets with numerous international awards to its credit. This award-winning technology is packed into every monitor. All PGS monitors are manufactured to exacting specifications in order to produce the best possible screen image at a multitude of resolutions. Non-interlaced refresh rates are kept high for flicker-free performance that reduces eye fatigue and allows for prolonged periods of use.

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	EO40	EO50	EO70	EO17	EO75
Display size	14"	15"	17"	17"	17"
Viewable image size	13.4"	13.8"	15.8"	15.8"	15.8"
Dot pitch	.28mm	.28mm	.28mm	.26mm	.26mm
Max. resolution (non interlaced)	1024 x 768	1280 x 1024	1280 x 1024	1280 x 1024	1600 x 1200
Refresh rate	1024 x 768 @ 60Hz, 800 x 600 @ 75Hz	1280 x 1024 @ 60Hz, 1024 x 768 @ 75Hz	1280 x 1024 @ 60Hz 1024 x 768 @ 75Hz	1080 x 1024 @ 65Hz 1024 x 768 @ 75Hz	1600 x 1200 @ 75Hz, 1280 x 1024 @ 85Hz
CDW price	$239.78	$297.23	$546.07	$589.26	$691.99
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G810
Graphic series 21" monitor

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The G810 is a 21" monitor that offers an excellent screen image and advanced features at an affordable price. With the large screen area most business users want for their multi-tasking, desktop publishing or Internet applications, this is the perfect combination of price/performance value. Its flat square screen minimizes distortion while its 0.25mm dot pitch and maximum resolution of 1600 x 1200 produce superb high definition images.

P810
Professional series 21" monitor

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Outstanding performance coupled with exceptional value make the ViewSonic P810 an attractive addition to any system. Designed for demanding graphics applications including CAD/CAM/CAE, image processing and desktop publishing, its large 21" screen, ultra fine dot pitch, high resolutions and superior refresh rates make this monitor ideal for those seeking a superb front-of-screen presentation at a highly competitive price point.

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new

P815
Professional series 21" monitor

EPA POLLUTION PREVENTER

The ViewSonic P815 is designed specifically for the most demanding imaging and CAD/CAM/CAE professionals. With its low dot pitch, maximum resolution to 1800 x 1440, superior refresh rates and outstanding screen performance, this 21" monitor is a powerful tool for today's high end graphics, production, science and engineering applications.

	G810	P810	P815
Display size	21"	21"	21"
Viewable image size	20"	20"	20"
Dot pitch	0.25mm	0.25mm	0.25mm
Maximum resolution (non-interlaced)	1600 x 1200	1600 x 1200	1800 x 1440
Refresh rate	1280 x 1024 @ 83Hz	1280 x 1024 @ 88Hz	1600 x 1200 @ 91Hz
Special applications	page layout, CAD/CAM	CAD/CAM/CAE, image processing, desktop publishing	high-end graphics, production, science and engineering
CDW price	$1424.69	$1472.58	$1642.01
	CDW 72970	CDW 72015	CDW 72016

These Viewsonic monitors share the following features:

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Internal	**$149.29***	CDW 65766
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33.6K bps data/fax modem

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Internal	**$129.48***	CDW 45115
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MultiModem LT PC Card modem

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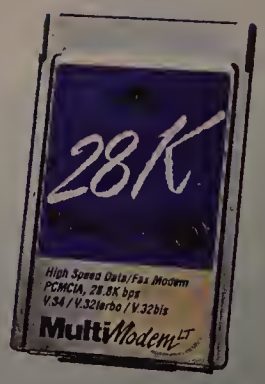

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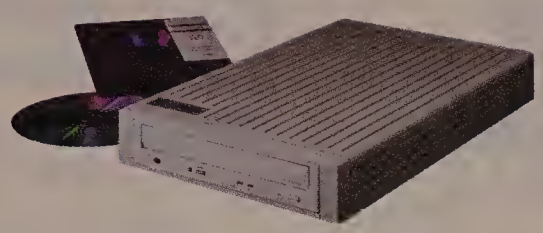
backpack 4X External parallel port CD-ROM drive ..... **$219.67** CDW 49826

backpack 4X External parallel port CD-ROM drive with sound ..... **$307.76** CDW 55848



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650MB rewritable storage and CD-ROM drive

The backpack pd/cd can be used as a removable storage device, a backup device and a CD-ROM. Just plug the backpack into the printer port of virtually any IBM-compatible PC—then plug your printer into the backpack. The backpack pd/cd drive works with virtually any IBM-compatible PC, portable or notebook computer—regardless of CPU speed. It provides you with unlimited access and storage capacity—650MB per pd cartridge.

✔ Easy to install, plugs into printer port ✔ Optical storage cartridge ✔ Data security: 30 years plus shelf life ✔ Can be used with multiple PCs

$549.75 CDW 70962

backpack 800TD

800MB portable tape drive

✔ Maximum capacity: 390MB uncompressed, 800MB compressed with 3M Travan TR-1 data cartridges ✔ Also accepts QIC-Wide, EC or any QIC-80 tape cartridge ✔ Recording format: QIC-80 ✔ Interfaces: standard parallel, enhanced parallel ports (EPP) and IEEE 1284 ports ✔ Up to 9MB/minute backup rate (compressed) ✔ Printer pass-through, detachable data cable ✔ Includes Windows 95, Windows and DOS backup software ✔ Lightweight, durable and compact ✔ Available in two colors—pearl or charcoal ✔ 2-year warranty

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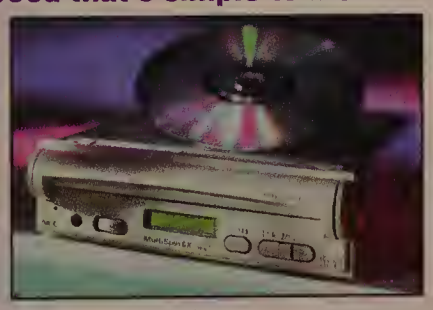
✔ 8GB tape backup ✔ Plugs into printer port ✔ 8GB on single TR-4 tape

NEC

MultiSpin 8V

Internal 8X CD-ROM reader

Screaming 8X speed that's simple to install



The NEC MultiSpin 8V™ internal CD-ROM reader delivers incredible 8X speed for smooth motion video. And it's an unbelievable value, too. The MultiSpin 8V gives you the power you need to enjoy today's most demanding multimedia software and load business applications quickly. 8X speed is the latest standard in CD-ROM performance, and you can be there with the NEC MultiSpin 8V, an unparalleled 8X value.

◆ Data transfer rate: 1200KB/sec ◆ 140ms access time ◆ Enhanced IDE interface card included ◆ Supports Multisession Photo CD™, Single Session Photo CD™, XA compatibility, Mode 2, Form 1 and Form 2, Enhanced CD (CD Extra), CD-I, Video CD Playback ◆ Includes cables, Windows 3.1 software disk ◆ 5.9" x 1.7" x 8.3" ◆ 2 lbs. ◆ 1-year limited warranty

MultiSpin 8V **$151.71** CDW 70754

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◆ Data transfer rate: 1200KB/sec ◆ 140ms average access time ◆ 130ms average random seek time ◆ 256KB cache memory ◆ Compatible with High Sierra, Macintosh HFS, Single/Multisession PhotoCD™, multisession data, XA ready, CD-I (FMV) Video CD Playback, CD Plus, CD+G, Plug and Play (PnP) ◆ SCSI-2 interface, card not included ◆ 8Xe includes SCSI data cable and AC power cord ◆ 8Xi includes SCSI ribbon cable, power Y cable and two internal audio cables ◆ 1-year limited warranty

MultiSpin 8Xi **$341.76** CDW 70755

MultiSpin 8Xe **$449.51** CDW 70756

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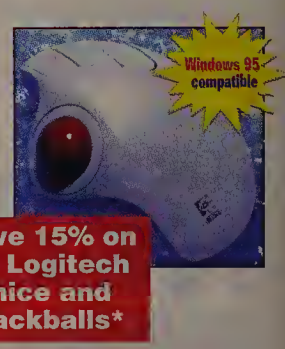
◆ 400 x 800 dpi optical, 1600 dpi interpolated resolution ◆ Supports TIFF, JPEG, PCX, BMP and EPS (output only) ◆ Compatible with TWAIN V3.2 and OLE V2.0 ◆ Software: Adobe PhotoDeluxe and Xerox TextBridge ◆ 1-year warranty

$121.32 CDW 72715

ScanMan Color **$184.51** CDW 63463

TrackMan Marble

The ultimate trackball



Save 15% on all Logitech mice and trackballs*

Logitech's TrackMan Marble trackball offers unmatched reliability, precision and performance. With patented Marble technology, it doesn't require regular cleaning. It includes MouseWare software so you can program each of the three buttons. Assign drag lock, double click or another command to one click of the third button.

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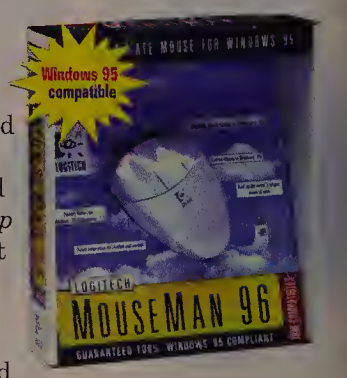
TrackMan Portable **$39.79*** CDW 32006

TrackMan Live **$99.19*** CDW 53245

MouseMan 96



MouseMan® 96 is designed to help you work better in Windows® 95. It's guaranteed 100% compliant with your Windows 95 applications and offers the ease of Plug and Play (PnP) installation. Unique *HyperJump* feature allows eight Windows management commands with one click of a button!

Includes: ✔ Mouseman 96 ✔ Round PS/2 to serial (9-pin) adapter ✔ 32-bit MouseWare software (16-bit also included for Windows V3.1 and DOS) ✔ 3-year warranty

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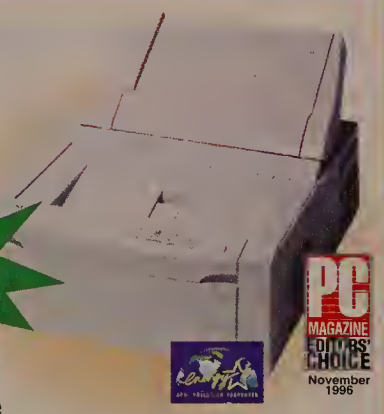
NEC

SuperScript 860

600 dpi laser printer



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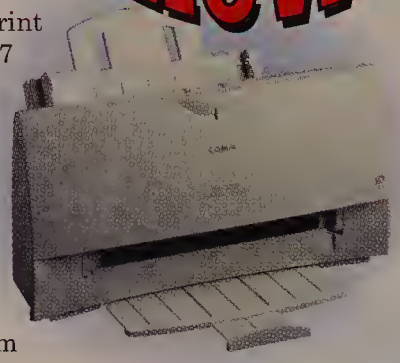

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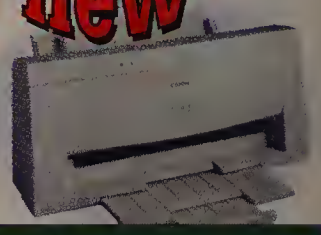

Wide carriage 11"x17"

For small or large tasks, the Canon® BJC-4550 is an outstanding value. Everything to meet the needs of a small business with big ideas has been considered, including the compact, space-saving size, and the convenience of dual interfaces for Macintosh® and PC.

■ 720 x 360 dpi resolution in color on plain paper, 720 x 360 dpi with smoothing in black and white ■ Maximum print speed: 1 ppm high quality color; 5 ppm high speed black and white ■ 300+ TrueType™ fonts on CD-ROM, 7 resident bitmap ■ 100 sheet built-in sheet feeder ■ Paper sizes: letter, legal, A4, #10 or European envelopes, A5, B5, 11" x 17" ■ Software: Canon Creative V2.0 CD-ROMs–create brochures, labels, business cards, flyers, picture frames, T-shirts and more ■ 1-year InstantExchange warranty program

$499.00 CDW 72598

MultiPASS C2500

Canon Convertible™ color printer for your home office

Canon's MultiPASS C2500 is a state-of-the-art Color Bubble Jet™ printer that offers built-in fully-featured plain paper faxing, convenience copying and scanning to complete a home office.

Bubble Jet™ printer

■ 720 x 360 dpi ■ 5 ppm print speed in black and white ■ 0.3 to 0.8 ppm in color ■ 150 sheet paper capacity ■ Supports envelopes, transparencies, fabric sheets, T-shirt transfers

Plain paper fax

■ Maximum resolution: 203 x 196 fine print, 203 x 96 standard, UHQ and 64 shades of gray ■ 6 seconds per page print speed ■ 42 page print memory

Copier

■ Up to 99 copies ■ 360 dpi resolution with smoothing

Scanner

■ Resolution: 200 dpi ■ Software included: Desktop Manager V1.3, Canon Creative V2.0 CD-ROMs ■ 2-year InstantExchange warranty program

$599.00 CDW 67252

BJC-620 Color Bubble Jet™ printer

The ultimate in color printing

new

■ 720 x 720 dpi ■ 1.7 ppm color print speed ■ 3 ppm black and white print speed ■ 300+ TrueType™ fonts on CD-ROM, 7 resident bitmap fonts ■ Canon Creative V2.0 CD-ROMs–offer easy-to-use tools to help make small and home businesses look professional ■ Microsoft® Windows® Printing system ■ 1-year InstantExchange warranty program

$399.00 CDW 72597

BJC-240 Color Bubble Jet™ printer

Amazing color for everything you do

new

■ 360 x 360 dpi color ■ 0.27 ppm color print speed ■ 4 ppm black and white print speed ■ 300+ TrueType™ fonts, 7 resident bitmap fonts ■ Canon Creative V2.0 CD-ROMs–create brochures, labels, business cards, flyers, picture frames, T-shirts and more ■ Color Advisor V2.0, Visual Guide, Super Solver software ■ 1-year InstantExchange warranty program

$179.00 CDW 72589

BC-06 ..... **$34.13** CDW 72600
◆ Photo ink cartridge for BJC-240

BC-22 ..... **$39.43** CDW 72605
◆ Photo ink cartridge for BJC-4200 and BJC-4550

BC-09F ..... **$34.13** CDW 72603
◆ Neon ink cartridge for BJC-200 series

BC-29F ..... **$39.95** CDW 72609
◆ Neon ink cartridge for use with BJC-4000 series

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new

$279.00

CDW 73069

EPSON Stylus Color 500

Award-winning Photo Quality color printing for today's office

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▼ Up to 4 ppm black text (360 x 360 dpi) ▼ ESC/P 2 and IBM® X24/X24E emulation ▼ Prints brilliantly on any type of paper ▼ Compatible with all Windows®, TrueType™ and Adobe® fonts ▼ Paper sizes: letter, legal, A4, B5, statement, executive, user definable ▼ IEEE-1284 parallel, serial connectivity ▼ 2-year limited warranty

PSON tylus ro

e next ep in lor kjet inters

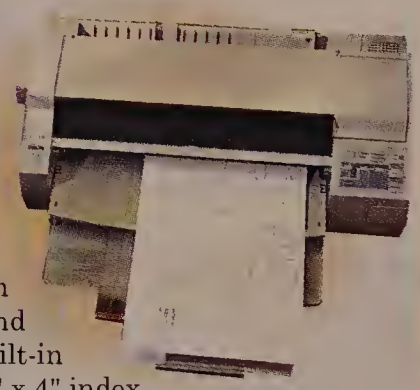
$379.00

CDW 57352

Maximum resolution:) x 720 dpi in black or or on plain paper with crodot technology Maximum print speed: 3 ppm black nting, 1 ppm color printing ▼ Paper sizes: letter, legal, B5, statement, executive ▼ Parallel and serial erfaces ▼ PC and Macintosh compatible Networkable—optional Ethernet or LocalTalk interface ds available ▼ 2-year limited warranty

EPSON Stylus 1500

The perfect color inkjet printer for a variety of needs



The Epson Stylus 1500 accepts continuous and single sheet paper simultaneously, making printing on envelopes, labels, transparencies and paper stock a breeze. Adjust the built-in feeder to handle everything from 4" x 4" index cards to C-size (17" x 22") paper stock.

▼ Up to 720 x 720 dpi ▼ 4-color photographic printing with true laser quality black ▼ 400 cps (characters per second) draft mode ▼ 200 cps letter quality mode ▼ 100 sheet paper tray capacity ▼ Tractor included ▼ Bi-directional parallel interface ▼ 2-year limited warranty

$995.00 CDW 66369

EPSON DOT MATRIX PRINTERS

Model	Carriage width	Pins	Features	CPS HS draft	CPS draft/utility	CPS NLQ	CPS LQ	CDW price	CDW
LX-300	normal	9	Optional color		264	53		$165.41	39520
FX-870	normal	9	Handles 4-part forms	380	342	68		$289.45	24686
FX-2170	wide	9	Handles 6-part forms	440	396	79		$499.00	62768
LQ-2070	wide	24	8 built-in bar codes; extended ribbon life	300	275		92	$383.04	73073
LQ-2170+	wide	24	Handles 5-part forms	440	396		132	$599.00	62773
DFX-5000+	wide	9	Dual paper paths	560	504	101		$1387.25	38206

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2050 Color Jetprinter

Thermal ink jet printer

Inkjet affordability and laser quality performance

Lexmark includes their exclusive Workshop CD-ROM software with every 2050. Now you can design your own greeting cards, labels and certificates, manipulate images from Photo CDs or downloaded from the Internet, and even create your own comic books with just a click of your mouse.

■ Up to 600 x 600 dpi edge sharpness in black and color ■ Up to 5 ppm black print speed ■ Host-based Windows® fonts ■ Paper sizes: letter, legal, A4, B5, envelopes, index cards, transparencies, iron-on T-shirt transfer sheets, heavy card stock for greeting cards ■ High speed parallel interface (IEEE 1284 compliant cable required) ■ Software: Lexmark Workshop CD-ROM™—Monotype GreetingCardMaker™, Monotype CertificateMaker™, Monotype T-Shirt DesignMaker™, SoftKey® Labels Unlimited®, EarthLink Network TotalAccess™ and Comic Creator™ ■ Super Sharp Waterproof™ black ink and vivid color cartridges ■ Starter paper pack ■ 1-year warranty, next business day exchange

$249.94 CDW 74303

2070 Color Jetprinter

■ 600 x 600 dpi ■ 7 ppm black draft quality, 5 ppm black letter quality

$338.40 CDW 62066

1020 Color Jetprinter

Thermal ink jet printer

Sharp, colorful printing for home or office

Ink saver mode

The Lexmark™ 1020 Color Jetprinter™ has what you're looking for in a color printer. Bright color and crisp text printing. Lexmark's patented inks and special imaging technology ensure great results, even on plain paper and transparencies. The Lexmark 1020 even comes with a high-yield, vivid color ink cartridge.

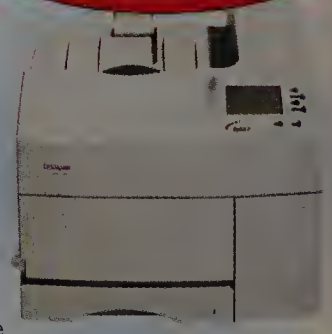
■ 600 x 300 dpi edge sharpness using digital enhancement in both black and color ■ 2-4 minutes per page color ■ 3 ppm black draft quality ■ Host-based Windows™ fonts ■ Paper sizes: letter, legal, B5, A4, executive, A5 and custom 3" x 5" to 8 1/2" x 14.33" ■ High-speed parallel interface, (IEEE 1284 compliant cable required) ■ Lexmark Workshop CD-ROM — Monotype GreetingCardMaker™, Monotype CertificateMaker™, Monotype T-ShirtDesignMaker™, SoftKey® Labels Unlimited®, EarthLink Network Total Access™, and Comic Creator™ ■ Starter paper pack ■ 2-year warranty

$148.15 CDW 62065

Optra R+

Desktop laser printer

$1255.23 CDW 69073



■ 300 or 600 dpi, with PQET ■ True 1200 x 1200 dpi, 8 ppm print speed ■ 4MB RAM standard, 64MB maximum ■ 25MHz AMD 29030 32-bit RISC CPU ■ Emulations: Enhanced PCL 5, Postscript Level 2 ■ Concurrent (hot) interfaces: parallel, serial and 2 network interface ports ■ Bi-directional communications Extended Capabilities Port (ECP) support ■ Includes MarkVision Windows-based utility for network management ■ Single element toner cartridge ■ Heavy duty 35,000 page per month duty cycle ■ 1-year LexExpress Warranty—next business day exchange via overnight delivery, optional on-site service available

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Optra Rn+ **$1483.44** CDW 69075
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Optra N

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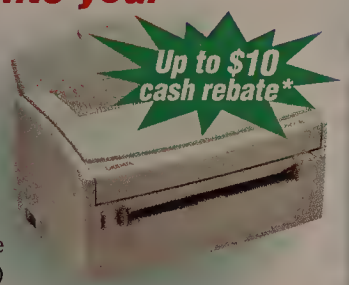

◆ 4 ppm print speed ◆ 600 dpi resolution ◆ Unlimited fonts through Windows ◆ Standard parallel IEEE 1284 bi-directional interface ◆ Plug and Play (PnP) compatible ◆ 100 sheet autofeeder paper input, 30 sheets paper output ◆ Paper types: letter, legal, executive, A4, A5, A6, B5, envelopes, mailing label stock, transparencies ◆ 1-year limited warranty with Okidata Overnight Exchange ◆ 5-year limited warranty on LED printhead

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Okidata OL600e

High resolution personal business printer

◆ 6 ppm print speed ◆ 600 dpi class output quality in Windows applications ◆ 300 dpi resolution with DOS applications ◆ 1MB RAM standard, 18MB maximum; Enhanced Memory Management ◆ 25MHz RISC microprocessor for fast print processing ◆ PCL 4.5 emulation, 44 bitmap fonts ◆ 100 sheet paper handling standard ◆ 5-year warranty on LED printhead, 1-year limited warranty on parts and labor

$399.00 CDW 59207

OL610E **$497.33** CDW 59208

Okidata OL810e

Fast, affordable and powerful

◆ 8 ppm print speed ◆ 600 x 1200 dpi maximum resolution ◆ 2MB RAM standard, 34MB maximum ◆ HP® PCL® 5e emulation ◆ 45 resident fonts ◆ Interfaces: enhanced bi-directional parallel port and EPP serial port with auto-switching ◆ 250 sheet universal paper tray ◆ Low power consumption design, EPA Energy Star compliant ◆ Warranty: 5 years on LED printhead, 1-year parts and labor

$673.62 CDW 55033

HEWLETT® PACKARD

HP DeskJet 400 printer

Affordable, personal printer

◆ Resolution: 600 x 300 dpi black, 300 x 300 dpi color ◆ 3 minutes per page color ◆ 16KB RAM ◆ 48KB input buffer ◆ Emulation: HP PCL Level 3 ◆ Fonts: Courier bitmap; GC Times and Letter Gothic (portrait only) ◆ Paper sizes: 7.35" x 10.5" to 8.5" x 14" ◆ Envelopes, transparencies and HP premium media ◆ 1-year limited warranty ◆ HP C2642A

$204.61 CDW 72181

HP LaserJet 5L Xtra printer

Ultimate professional personal printing

◆ 600 x 600 dpi ◆ 4ppm print speed ◆ Emulation: Enhanced HP PCL 5, with 26 TrueType scalable fonts ◆ Memory: 1MB standard, 9MB maximum ◆ Prints on letter, legal, A4, A5, executive, envelopes, transparencies, card stock, postcards and labels ◆ 1-year warranty ◆ HP C3941C

$429.00* CDW 71446

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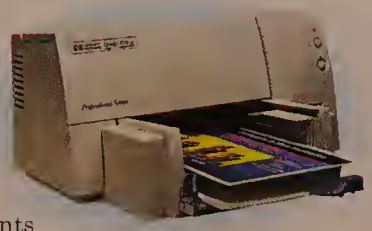
HP DeskJet 870Cse printer

Sharp text, flexible connections and brilliant color



◆ Resolution: 600 x 600 dpi black, 600 x 300 dpi C-REt color ◆ Best quality mode: 4 ppm black print speed, 1 ppm color print speed ◆ 20MHz RISC processor ◆ Memory: 512KB built-in RAM, 32KB receive buffer ◆ Emulation and fonts: HP PCL Level 3, 26 built-in scalable fonts, 27 TrueType fonts for Macintosh, 126 TrueType fonts for Windows ◆ Interfaces: RS-422 serial, AppleTalk® high-speed serial, Centronics parallel, IEEE 1284 compliant with 1284-B receptacle ◆ 1-year warranty ◆ HP C4565A

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$499.00 CDW 72326

HP LaserJet 6P printer

Full-featured laser printer for business

◆ Resolution: true 600 x 600 dpi laser ◆ 8 ppm print speed ◆ Memory: 2MB RAM standard plus Memory Enhancement technology (MEt) ◆ HP PCL 6, 45 scalable typefaces built-in with an additional 65 on disk for Windows® ◆ Letter, legal, transparencies, envelopes, labels and postcards ◆ 250-sheet universal cassette tray and 100-sheet multipurpose tray ◆ 1-year warranty with free HP Express Exchange overnight printer replacement

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$764.81 CDW 74906

HP LaserJet 6MP printer ..... **$913.65** CDW 74908

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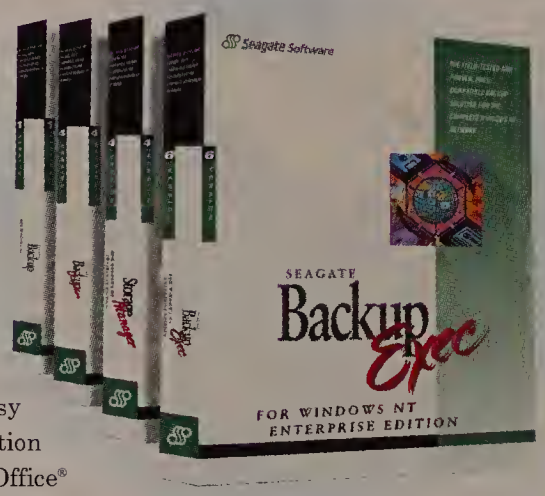

Seagate Backup Exec V6.11 for Windows NT is the field-proven, 100% compatible data protection solution for cross-platform, enterprise environments. It automates backup and restore functions with an integrated scheduling system for unattended operation. With its 32-bit performance and broad range of device support, Seagate Backup Exec V6.11 is fast and easy to use. And it's the only data solution that offers 100% Microsoft® BackOffice® support.

✔ Automates unattended scheduled backups for all servers and workstations ✔ Performs remote administration with Windows NT Remote Access Services (RAS) support ✔ Includes built-in STAC-LZS software data compression ✔ Runs multiple jobs simultaneously with multi-drive concurrent backup capabilities ✔ Offers both client and server support: DOS, all flavors of Windows, OS/2, NetWare V3.x and V4.x, Macintosh and UNIX ✔ Compatible with all devices supported by Windows NT ✔ Optional Autoloader, SNMP, Macintosh and UNIX support available

Single Server Edition	$432.83	CDW 73810
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Backup Exec V7.11 for NetWare

Seagate Backup Exec V7.11 for NetWare simplifies and automates enterprise data protection with an integrated scheduling system, while its Agent Accelerator technology maximizes backup performance. Backup Exec fully protects your NetWare, Windows NT and LAN servers as well as DOS, Windows, Windows 95, Windows NT, Macintosh, OS/2 and UNIX workstations-right out of the box. Selected as "Product of the Year" by LAN Magazine based on its high speed, broad functionality and overall performance, Seagate Backup Exec offers unmatched reliability for true enterprise-wide data protection.

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Backup Exec V7.11 for NetWare ..... $889.15 CDW 76531

Backup for Windows 95

Seagate Backup for Windows 95, designed especially for Microsoft® Windows 95-based workstations, offers you complete data protection. Older DOS and Windows V3.x backup systems simply can't meet the demands of Windows 95 environments–leaving valuable data at risk.Backup for Windows 95 protects all your data, including long file names and the Registry database. Fully integrated with the OS to maximize performance, its 32-bit multi-threading and multi-tasking design enables you to complete backups faster than you ever thought possible.

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Storage Manager™ is the backup, archiving and integrated HSM software for growing networks. By using a single, integrated product you eliminate the problems of compatibility or synchronization of separate backup and storage management systems. You reduce the costs and ease administration since on-line, near-line and off-line data is managed from a single interface, with a shared tracking database, media library and hardware.

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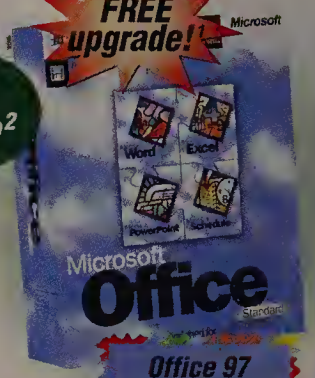

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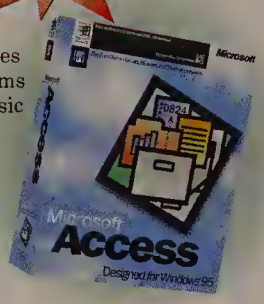

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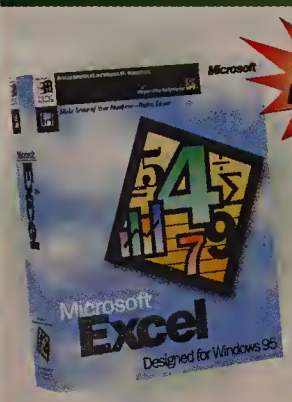

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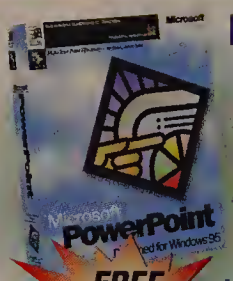

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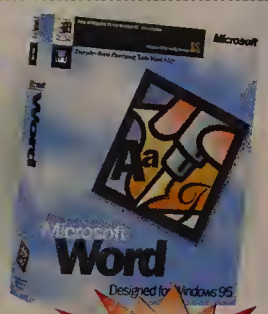

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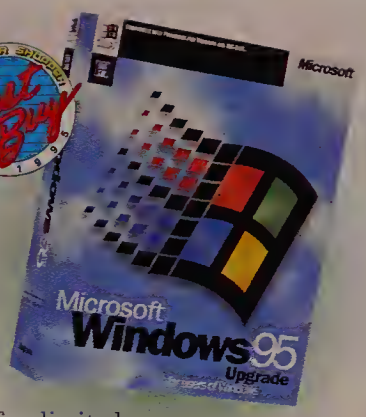

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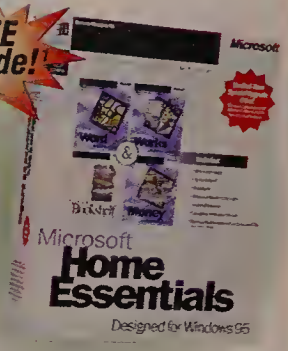

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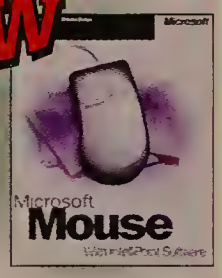

IntelliPoint is ready for Windows® 95 and its toolbar gives you easy access to the features you use most: Shortcuts, Magnify, LineLock, AutoScroll, Trails and ClickLock. You also get more than 125 cursors, including many with animation.

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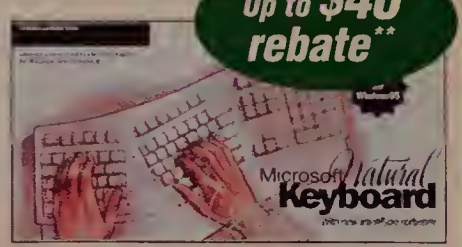

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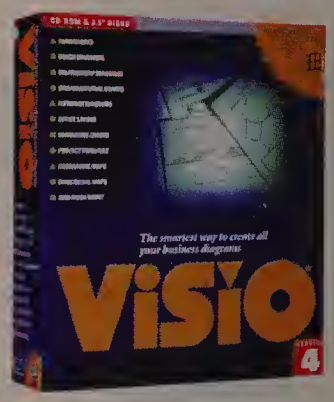

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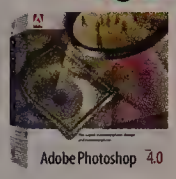

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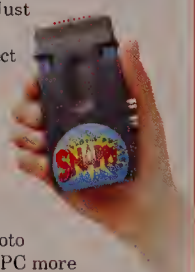

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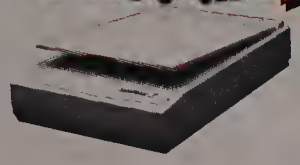

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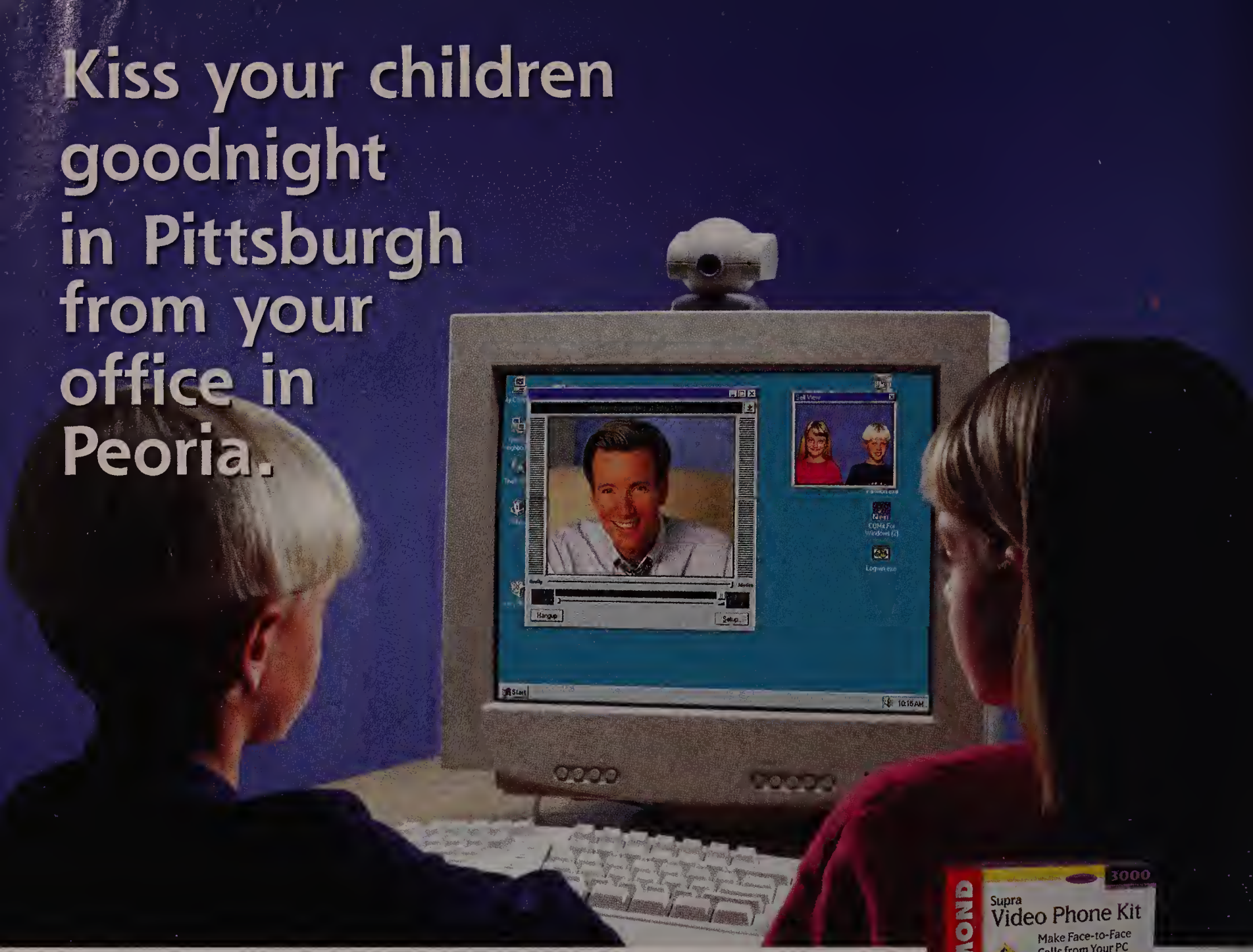

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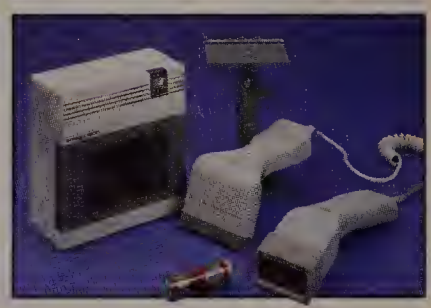

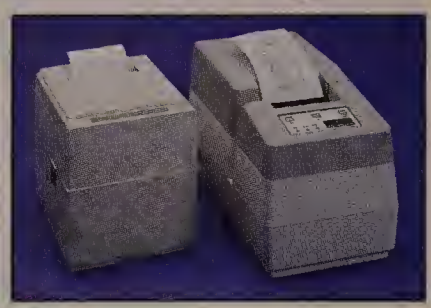

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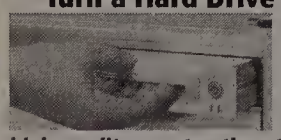

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NEC	4X	CDR4X4	4Disk	250ms	$99
Internal SCSI					
Nakamichi	8X	MJ48S	4Disk	150ms	$549
				External	$599
External SCSI					
Pioneer	4.4X	DRM-624X	6 Disk	190ms	$359

CD ROM TOWERS

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2 drive model holds 8 CDs	$1199
4 drive model holds 16 CDs	$2900
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• TAPE DRIVES •

Capacity	Brand & Model	Price
	• SCSI •	
4-8GB	Seagate TST8000	$379
	• 4mm DAT DRIVES •	
2GB	Hewlett Packard C1534	$609
2-4GB	Seagate C4324RP	$679
2-4GB	Hewlett Packard C1536	$699
4-8GB	Sony SDT5000	$809
4-8GB	Seagate C4326NP (DDS2)	$859
4-8GB	Hewlett Packard C1533A	$929
4-8GB	Sony SDT7000 ***TURBO SPEED!***	$909
24-48GB	HP External 6 tape loader C1553AX	$2299
32-64GB	Sony TSL7000 8 tape autoloader	$2199
48-96GB	Seagate C4586NP 12 tape autoloader	$2399
	• 8mm DAT DRIVES •	
3.5-7GB	ExaByte EXB8205XL	$1269
7-14GB	ExaByte EXB8505XL	$1889
7-14GB	ExaByte EXB8700LT	$1089
20-40GB	ExaByte EXB8900	$5499
70-140GB	ExaByte EXB10H 10 tape autoloader	$5439
	• DLT DRIVES •	
15-30GB	Quantum DLT2000	$2499
	• QIC •	
800MB	$141	
1GB	$159	
1.7GB	$219	
3.2GB	$239	
4.4GB	$255	
External for Printer Port		
800MB	$259	
1Gig	$269	
Internal IDE		
4-8Gig	$399	

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• IDE HARD DRIVES •

IDE	Speed	RPM	Brand	Model	Wty	Price
540MB	14ms	3600	Seagate	ST3541A	3	$139
631MB	14ms	3600	Seagate	ST3630A	3	$145
B50MB	10ms	4500	Western Digital	AC2B50	3	$165
B50MB	14ms	3600	Seagate	ST3B51A	3	$155
1200MB	10ms	5400	Fujitsu	M1636T	3	$195
1250MB	15ms	3600	Quantum	BF1250A	3	$175
1275MB	12ms	4500	Seagate	ST31276A	3	$195
12B0MB	11ms	4500	Quantum	TM312B0A	3	$195
1281MB	11ms	5200	Western Digital	AC21200A	3	$199
1330MB	12ms	44B0	Maxtor	M71336A	3	$195
1623MB	14ms	3600	Seagate	ST31621A	3	$212
1624MB	10ms	5200	Western Digital	AC21600	3	$225
1626MB	11ms	44B0	Maxtor	M71626AP	3	$220
1670MB	11ms	44B0	Maxtor	M71670A	3	$215
1700MB	11ms	4500	Quantum	SR31700A	3	$21B
1700MB	10ms	5400	Fujitsu	M1623T	3	$219
2004MB	11ms	44B0	Maxtor	M72004A	3	$255
2100MB	11ms	5200	Western Digital	AC22100	3	$279
2100MB	9ms	5400	Fujitsu	M1624T	3	$269
2167MB	**10.5ms**	**5400**	**Seagate**	**ST32140A**	**3**	**$269**
2168MB	10.5ms	4500	Quantum	TM32160A	3	$265
2500MB	9ms	5400	Fujitsu	M163BT	3	$295
2550MB	15ms	3600	Quantum	BF2500A	3	$249
2550MB	11ms	4500	Quantum	SR32550A	3	$295
2559MB	11ms	5200	Western Digital	AC32500	3	$299
2700MB	12ms	4480	Maxtor	M72700A	3	$315
3166MB	12ms	5200	Western Digital	AC33100	3	$369
3254MB	**10.5ms**	**4500**	**Quantum**	**TM33200A**	**3**	**$339**
3500MB	12ms	44B0	Maxtor	MB3500A	3	$429
3940MB	10.5ms	4500	Quantum	TM33B40A	3	$395
4250MB	10.5ms	5400	Seagate	ST34250A	3	$Call
2 1/2"						
10B0MB	13ms	4200	Toshiba	MK1002MA	1	$325
1350MB	13ms	4200	Toshiba	MK1301MA	1	$455
1350MB	13ms	4200	Toshiba	MK2720FC	1	$455
1700MB	13ms	4200	Toshiba	MK1702MA	1	$545
2100MB	13ms	4200	Toshiba	MK2101MAN	1	$595

• SCSI HARD DRIVES •

SCSI	Speed	RPM	Brand	Model	Wty	Int	Ext
1050MB	9ms	5400	Seagate	ST31055N	3	$349	$409
1280MB	12ms	4500	Quantum	TM31280S	3	$299	$359
2110MB	10.5ms	4500	Quantum	TM32110S	3	$379	$439
2150MB	9ms	5400	Seagate	ST32155N	5	$485	$545
2150M8	8.5ms	7200	Quantum	XP32150	5	$629	$689
3254MB	10.5ms	4500	Quantum	TM33200S	3	$459	$519
4290MB	8ms	7200	Seagate	ST15230N	5	$885	$945
4290MB	8ms	7200	Seagate	ST15150N	5	$Call	$Call
4350MB	8ms	7200	Seagate	ST34371N	5	$1155	$1215
9080M8	11ms	5400	Seagate	ST410800N	5	$1779	$1879
9100MB	8ms	7200	Seagate	ST19171N	5	$2095	$2195
WIDE SCSI							
2147MB	8ms	7200	Seagate	ST32550W	5	$789	$919
2150M8	9ms	5400	Seagate	ST32155W	5	$559	$689
2150MB	8.5ms	7200	Quantum	XP32150W	5	$609	$739
4294MB	8ms	7200	Seagate	ST15150W	5	$Call	$Call
4300M8	8.6ms	7200	Quantum	XP34300W	5	$879	$1009
9100MB	11ms	5400	Seagate	ST410800W	5	$2029	$2219

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2MB X 32 - 70NS EDO SIMMS	75
4MB X 32 - 60NS SIMMS	109
4MB X 32 - 70NS SIMMS	111
4MB X 32 - 60NS EDO SIMMS	112
4MB X 32 - 70NS EDO SIMMS	114
8MB X 32 - 60NS SIMMS	225
8MB X 32 - 70NS SIMMS	228
8MB X 32 - 60NS EDO SIMMS	231
8MB X 32 - 70NS EDO SIMMS	235
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OL410, 810 2-4MB	152
OL800, 820 1-4MB	101
OL800, 820 2-4MB	147
OL800, 820 3-4MB	200

Panasonic

KX-4410, 4430 1-4MB	95
KX-4410, 4430 2-4MB	130
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Deskpro XL Series, Desktops, 16MB	197
Deskpro XL Series, Desktops, 32MB	312
Deskpro XL6/50, Desktops, 16MB	273
Deskpro XL6/50, Desktops, 32MB	333
Proliant 1500/1500R/133 Servers, 16MB	190
Proliant 1500/1500R/133 Servers, 32MB	318
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Presario Series, Desktops, 16MB	118
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Vectra XU/VT 6150, MT, 32MB	338
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PC 300/700, Desktops/MT, 16MB	173
PC 300/700, Desktops/MT, 32MB	267
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HP Omnibook 530, 600, 4MB/8MB	116/200
HP Omnibook 4000 Series, 4MB	84
HP Omnibook 4000 Series, 16MB	141

IBM

Thinkpad 365C Series, 4MB /16MB	39/162
Thinkpad 701C Series, 4MB /8MB	41/92
Thinkpad 701C Series, 16MB	187
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LaserJet 4, DJ1200, DJ600, 16MB	122
LaserJet 4, DJ1200, DJ600, 32MB	341
LaserJet 4P, 4+, 4V, DJ650C, 4MB	30
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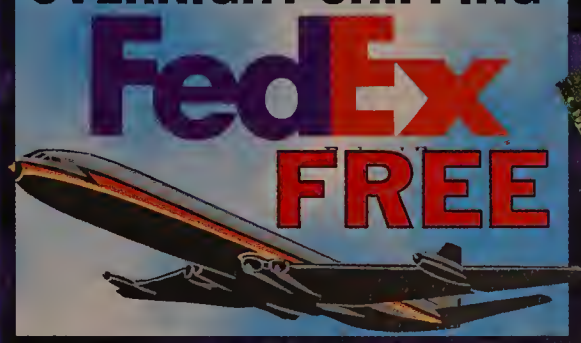

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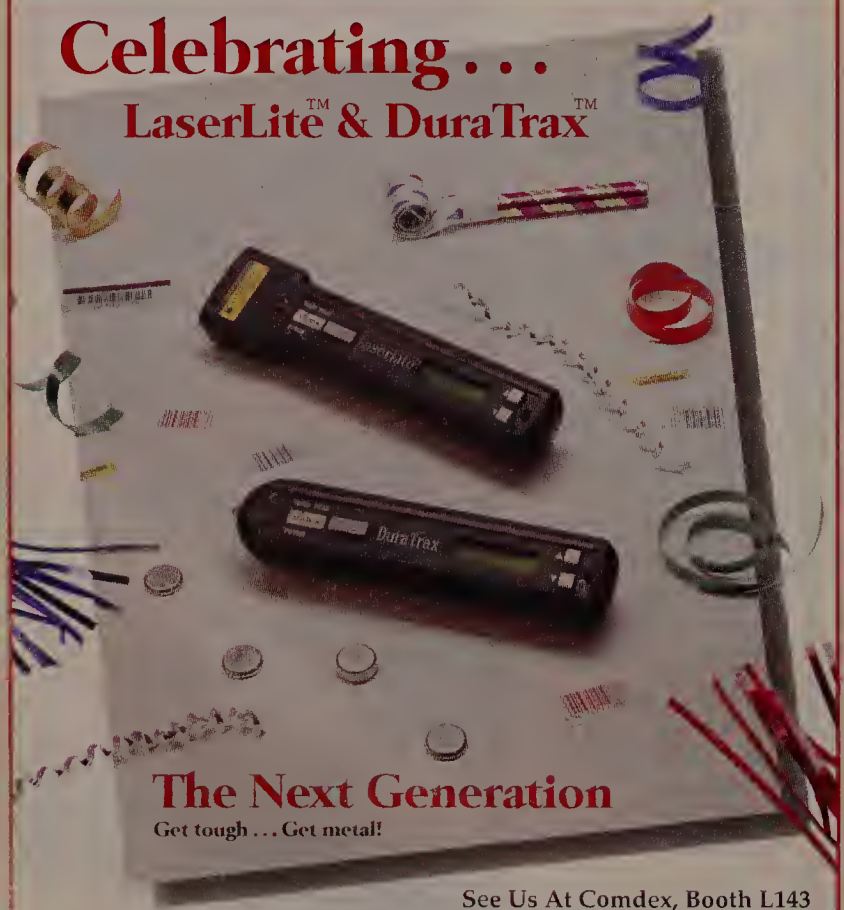

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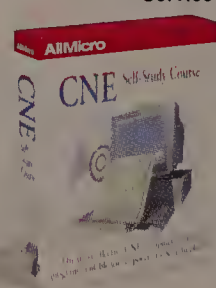

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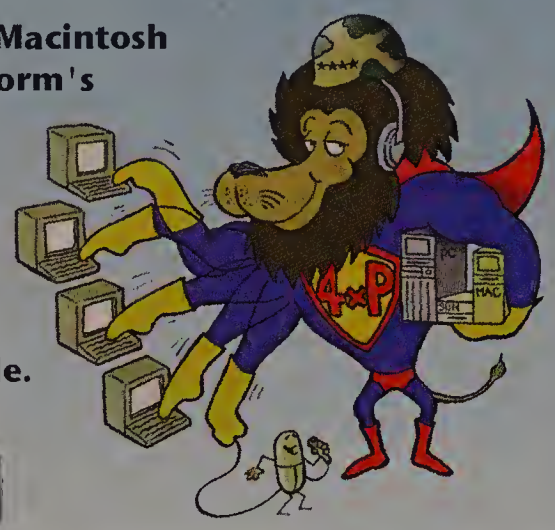

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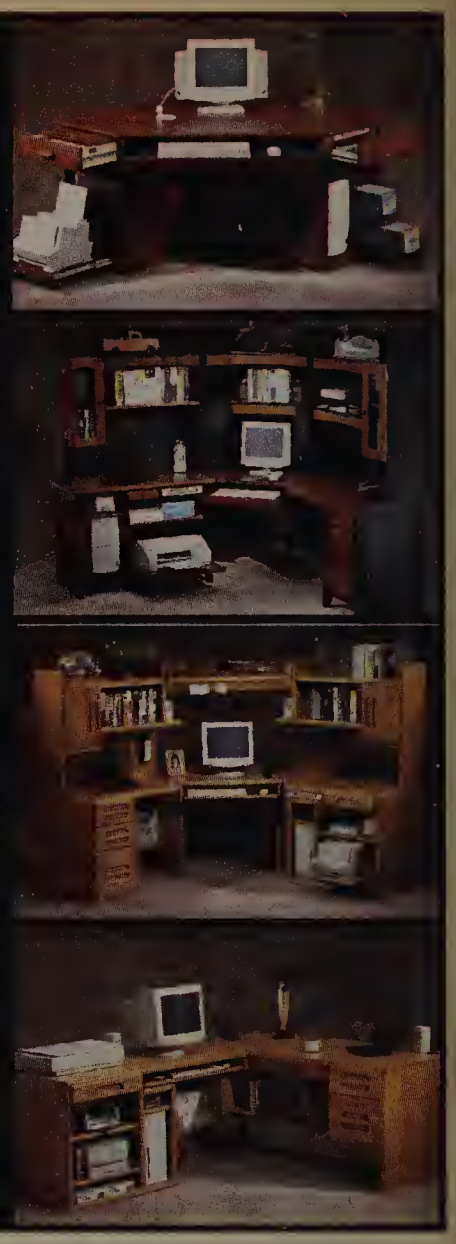

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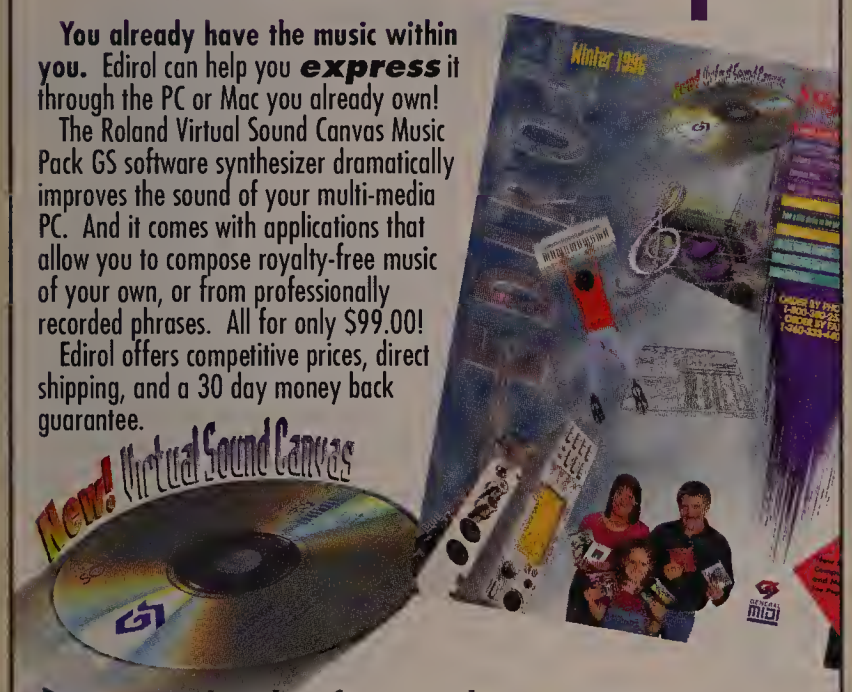

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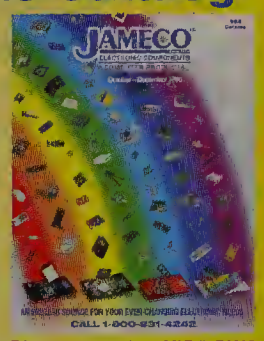

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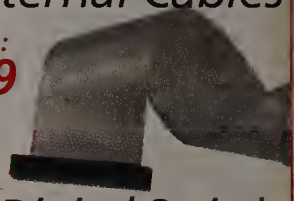

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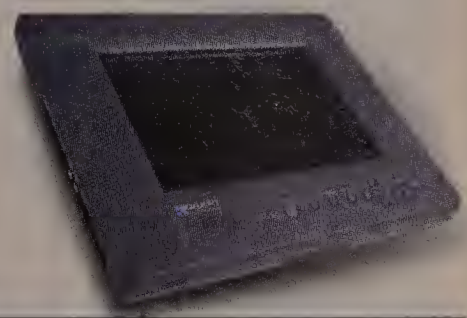

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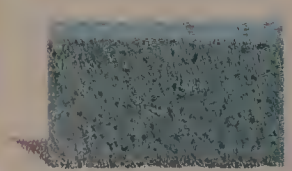

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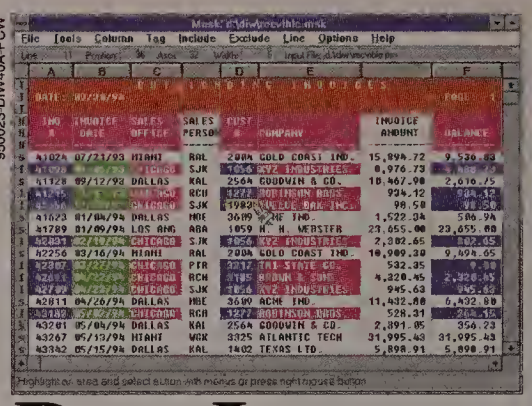

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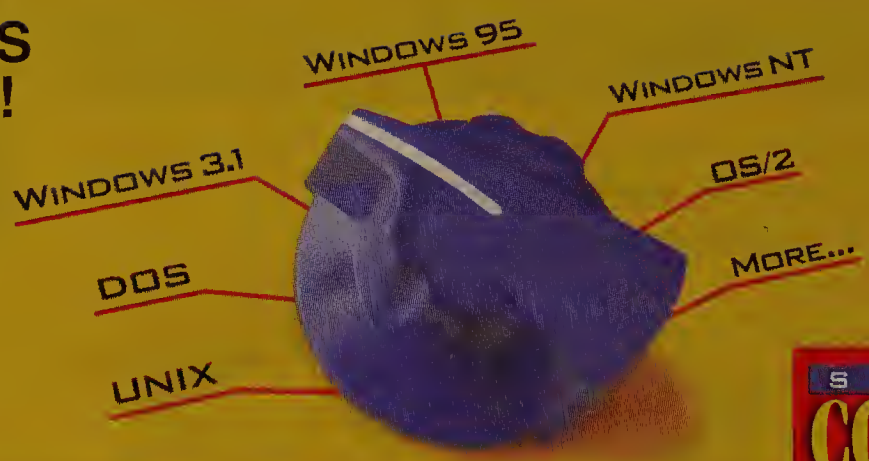

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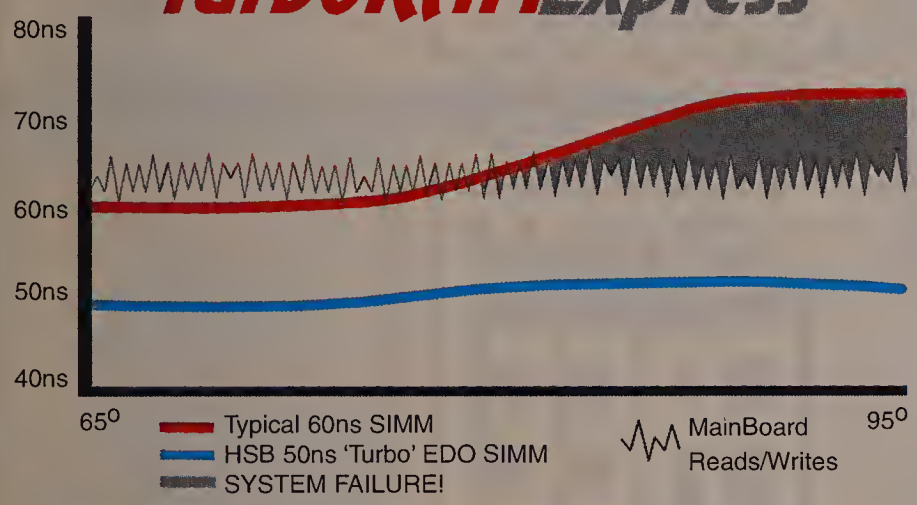

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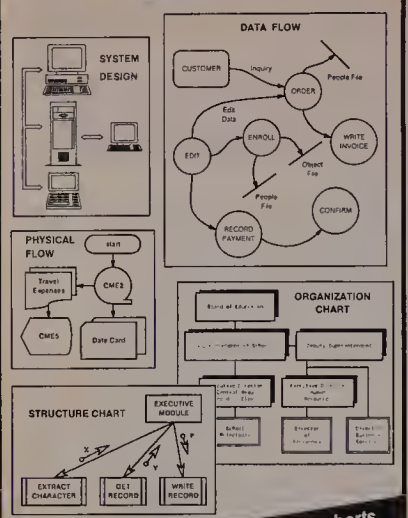

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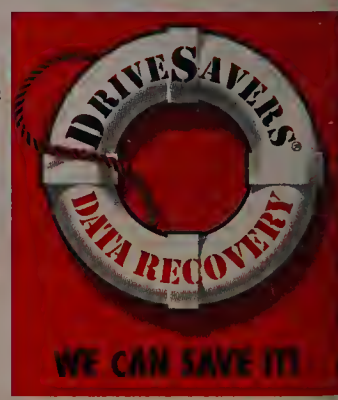

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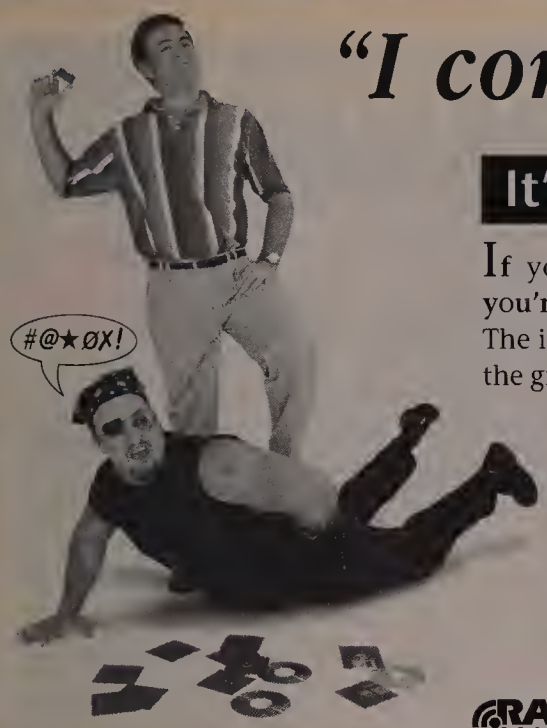

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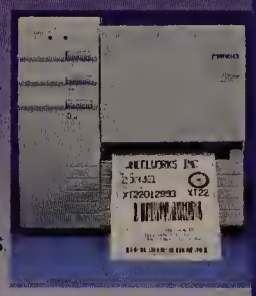

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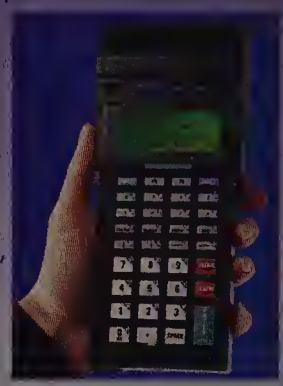

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962 Storage devices

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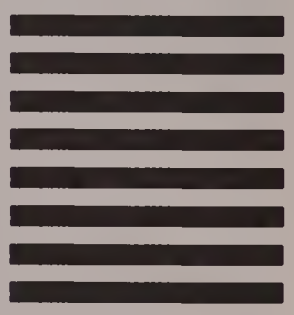

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12950 SW PACIFIC HWY STE 7
TIGARD OR 97223-9750

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

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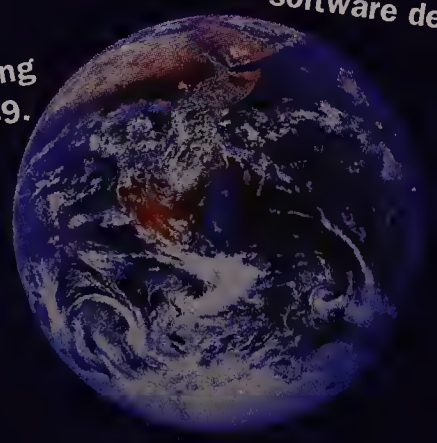

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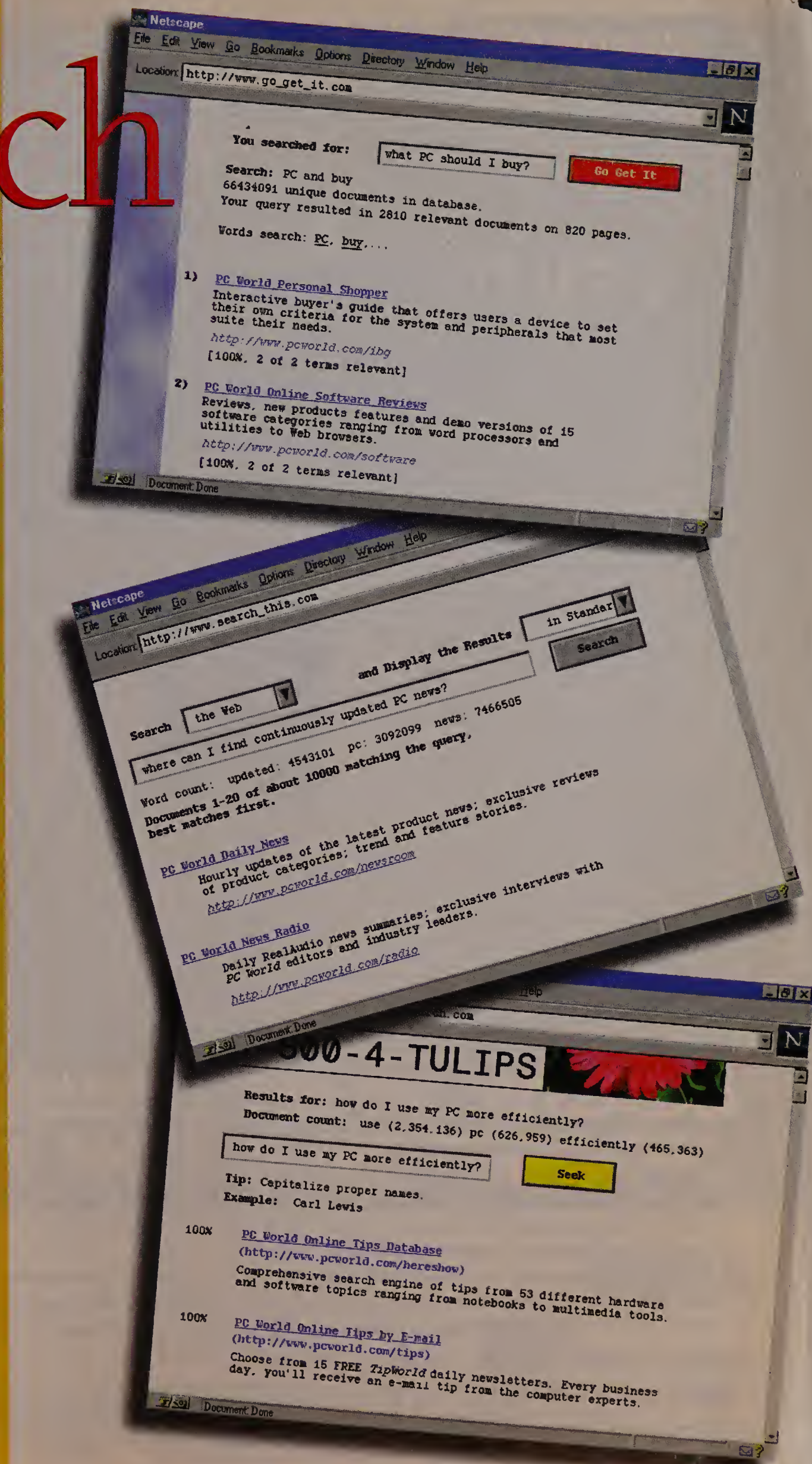

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Contributing Editor Stephen Manes is a columnist for the New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).* ■

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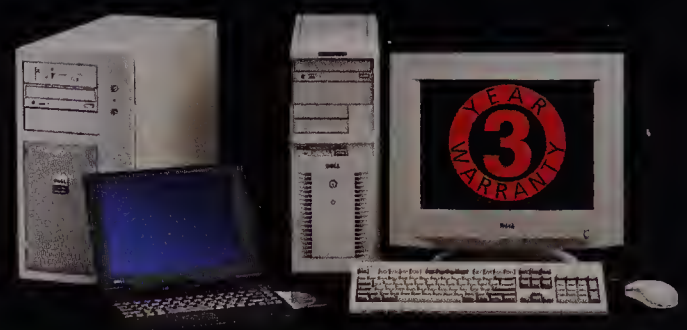

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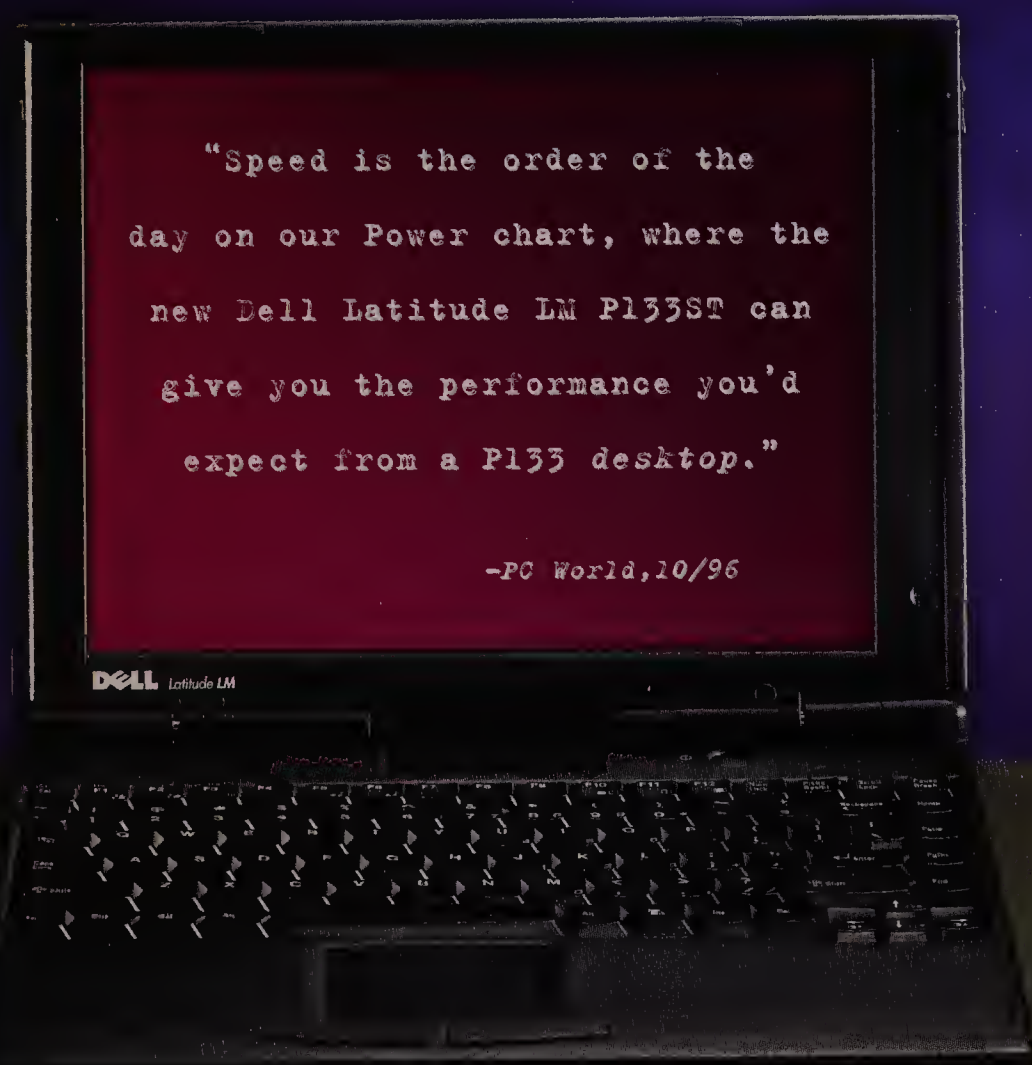

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